Department of Defense FY 1998/1999 Biennial Budget Estimates February 1997



RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE Volume 2 - Ballistic Missile Defense Organization

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Ballistic Missile Defense Organization FY 1998/1999 R D T & E Program

Exhibit R-1

Date: FEB 1997 Appropriation: 0400 D Research Development Test & Eval Defwide

	Program		;	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	Thousands of Dollars	
Line No	Line Element No Number	Item	Act	FY 1996	FY 1997	FY 1998	EV 1999 C
			:	1 1 1 1 1 1 1 1 1 1 1 1 1	t t t t	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
6	0602173C	Support Technologies - Applied Research	2	96,092	102,510	101,932	95,488 U
	Applied Research	lesearch		96,092	102,510	101,932	95,488
29	06031730	Support Technologies - Advanced Technology Development	æ	130,611	251, 294	147,557	144,902 U
	Advanced	Advanced Technology Development		130,611	251,294	147,557	144,902
74	0603861C	Theater High-Altitude Area Defense System - TMD -	4	565,818	341,307	294,647	16,778 U
75	06038630	HAWK System BM/C3 - Dem/Val	4	22,819			n
97	0603864C	Theater Missile Defense BM/C3 - Dem/Val	4	27,147			n
17	0603867C	Navy Area Theater Missile Defense - Dem/Val	4	277,565	59,315		Đ
78	06038680	Navy Theater Wide Missile Defense - Dem/Val	4	200,442	304,171	194,898	192,073 U
79	06038690	Meads Concepts - Dem/Val	4	20,123	56,232	47,956	0 605'6
80	0603870C	Boost Phase Intercept Theater Missile Defense	4		23,276	12,885	Ω
81	0603871C	National Missile Defense - Dem/Val	4	730,656	828,864	504,091	393,085 U
82	0603872C	Joint Theater Missile Defense - Dem/Val	4	429,137	506,492	542,619	514,109 U
	Demonstra	Demonstration and Validation		2,273,707	2,119,657	1,597,096	1,125,554
89	0604861C	Theater High-Altitude Area Defense System - TMD -	ហ		277,508	261,480	578,467 U
06	0604864C	Theater Missile Defense BM/C3 - EMD	Ŋ	10,118			n
91	0604865C	Patriot PAC-3 Theater Missile Defense Acquisition - EWN	2	352,547	381,092	206,057	101,430 U
92	0604866C	PAC-3 Risk Reduction - EMD	2	23,358			Ω

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Ballistic Missile Defense Organization FY 1998/1999 R D T & E Program

Exhibit R-1

Appropriation: 0400 D Research Development Test & Eval Defwide

				,	**************	
Program Line Element		;	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	;	Thousands of Dollars
Number	Item	Act	FY 1996	FY 1997	FY 1998	FY 1999 C
93 0604867C	7C Navy Area Theater Missile Defense - EMD	ស		241,330	267,822	226,748 U
Engine	Engineering and Manufacturing Development		386,023	899,930	735,359	906,645
104 0605218C	8C Ballistic Missile Defense RDT&E Program Management and Support	. 6	158,748			n :
RDTGE	RDT&E Management Support		158,748	1 1 1 1 1 1		
Total Balli	Ballistic Missile Defense Organization		3,045,181	3,373,391	2,581,944	2,272,589

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BALLISTIC MISSILE DEFENSE ORGANIZATION FY 1998 President's Budget Overview

- existing and emerging ballistic missile Defense Program is structured to respond to forces, allies, and friends around the world. First priority is Theater Missile Defense, (TMD), second priority is National Missile Defense (NMD) and, third priority is an investment in BMD advanced technologies in order to enhance future BMD capabilities for both TMD and NMD.
- The PATRIOT mission is to provide asset and force protection from all types of air and short range tactical missile threats. The THAAD mission is to defeat endo/exo TBMs with PATRIOT PAC-3 upgrades, Navy Area Defense program, the Theater High Altitude Area Defense (THAAD) system, and Navy Theater-wide BMD. The TMD program also includes MEADS and appropriate battle management, command, control, and communications for these theater capabilities. The mission of the Navy Area Defense program is point The Navy Theater-wide BMD complements it by engaging the Both are stand off weapon systems used to protect longer range, high altitude threat. multiple shot opportunities. defense of strategic assets. U.S. Forces and our allies.
- addition, contract strategies are being implemented that will allow for fielding and maintaining an initial NMD system by FY 2003. Program risk is being reduced by performing the maximum number of system level tests between FY 2000 and FY 2003. Directly supporting the NMD program is the Space Based Infrared System (Low Component) (funded and managed by the Air Force). In April 1996 the USD(A&T) designated NMD as an ACAT 1D program and in 3. <u>NATIONAL MISSILE DEFENSE PROGRAM (NMD):</u> The NMD program is a deployment readiness program that involves developing the element hardware that will be used in an FY 1999 integrated system test (IFT-5) intended to demonstrate an NMD capability. July 1996 the program successfully completed its first OIPT review.

- developing and validating technologies, and integrating subsystems, which could be part of New ideas and technologies for missile defense are To meet future needs, the Advanced Technology program is investing in high leverage technologies for improved capabilities in kinetic energy interceptors and advanced sensors. Limited directed energy efforts are programmed for global boost phase intercept defense. New ideas and technologies for being investigated by the Innovative Sciences and Technology program. ADVANCED TECHNOLOGY:
- 5. SUMMARY: When the core TMD systems are deployed, U.S. forces overseas will have defensive capability against a broad spectrum of short and longer-range theater-class ballistic missiles. Meanwhile, BMDO is committed to maintaining a well-focused deployment continue to demonstrate advanced technologies as options for enhancing initial BMD systems. The Department of Defense remains committed to ensuring that as new ballistic threats arise, highly effective ballistic missile defenses will be in place to defend our readiness program for National Missile Defense of the United States. BMDO also will

	RDT&E BUDGET ITEM		TIFICAT	TION SE	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhi	bit)		DATE Fet	February 1997	97
80DG 2 - /	BUDGET ACTIVITY 2 - Applied Research			PENU 060 Res	PE NUMBER AND TITLE 0602173C Supp Research	upport T	echnolo	PE NUMBER AND TITLE 0602173C Support Technologies - Applied Research	olied		
	COST (\$ in Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	96,092	102,510	101,932	95,488	86,025	82,161	78,543	78,411	Continuing Continuing	Continuing
1651	1651 Innovative Science and Technology (IST)	47,852	56,009	50,923	50,094	43,774	41,411	42,505	43,506	Continuing	Continuing
1660	1680 Statutory and Mandated Programs	48,240	46,501	51,009	45,394	42,251	40,750	36,038	34,905	Continuing	Continuing

A. Mission Description and Budget Item Justification

significantly change how BMDO develops future systems. The technologies pursued include: next generation sensors, power, information processing, optics, advanced objectives of these investments are to provide: (1) component technologies that offer improved performance or reduced costs for BMDO acquisition programs; (2) a materials, propulsion and communication. This project causes and exploits breakthroughs in science that will keep BMD at the foremost edge of what is possible. A better understanding of the physical processes to support these acquisition programs; and (3) technical solution options to mitigate unpredicted threats. Unlike other To prepare to meet critical future active defense needs, advanced technology programs invest in an aggressive program of high leverage technologies that yield markedly improved capabilities across a selected range of boost phase and terminal defense interceptors, advanced target sensors, and innovative science. The BMDO projects that fund near term technology and testing efforts, this advanced technology initiative invests seed money in high-risk technologies that could primary project goal is to conduct proof-of-concept demonstrations that transition technology to development programs. Many of today's baseline technologies on BMDO systems like Theater High Altitude Area Defense (THAAD), Patriot Advanced Capability (PAC3), and Ground Based telluride ultra-sensitive infrared detectors; 32-bit radiation hardened Reduced Instruction Set Computer (RISC) processors for image analysis; composite materials for ightweight satellite structures; interferometric fiber-optic gyroscopes for sophisticated guidance and control; and solid-state gallium arsenide transmitter/receivers for Radar (GBR) are available due to the wise investment in innovative technologies some 10 years ago. Examples include: indium antimonide and mercury cadmium BMDO radars. The IST program is the only R&D program in the Defense Department focused on future BMDO technical requirements.

The Small Business Innovative Research (SBIR) and the Small Business Technology Transfer (STTR) programs for all of BMDO are managed under this budget item. Pursuant to PL 102-564, a two-phased competition for small businesses with innovative technologies is conducted, focusing on BMDO relevant technologies with an emphasis on technologies with potential dual use. Acquisition Strategy: This R&D program receives proposals in response to an annual Broad Agency Announcement of research opportunities. Proposals received are competitively judged according to BMD relevance, cost, and capabilities of the offeror. Strong emphasis is placed on the dual-use nature of the proposed effort. For the SBIR and STTR programs, BMDO conducts the competitions and the executing agents award and manage the contracts.

Page I of II Pages

Exhibit R-2 (PE 0602173C)

RDT&E BUDGET ITEM JUSTI	FICATIO	N SHEET (USTIFICATION SHEET (R-2 Exhibit)	Ð.	DATE February 1997
BUDGET ACTIVITY 2 - Applied Research		PENUMBER AND TITLE 0602173C Supp Research	D ΤΙΤLE Support Te	PE NUMBER AND TITLE 0602173C Support Technologies - Applied Research	Applied
B. Program Change Summary (\$ in Thousands)					
Previous President's Budget Appropriated Value	EX 1996 89,230	FY 1997 94,023 104,023	EY 1998 86,459	EY 1999 86,702	Total <u>Cost</u> 356,414
Adjustments to Appropriated Value: a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	96,092	-1,109 -404 102,510	101,932	95,488	396,022
Change Summary Explanation: Funding: FY97 Congressional Plus-up for wide band-gap semiconductor research initiative. Schedule: Technical:	emiconductor	research initiativ	υ i		
C. Other Program Funding Summary (\$ in Thousands) See individual project R-2 exhibits					
D. Schedule Profile See individual project R-2 exhibits					

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Exhibit R-2 (PE 0602173C)





RDT&E BUDGET ITEM	EM JUS	TIFICA	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhit	oit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 2 - Applied Research			PE NU 060 Res	PE NUMBER AND TITLE 0602173C Support Technologies - Applied Research	ाग∟E upport T	echnolog	gies - Apı	olied	р. •	РРОЈЕСТ 1651
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1651 Innovative Science and Technology (IST)	47,852	56,009	50,923	50,094	43,774	41,411	42,505	43,506	Continuing	43,506 Continuing Continuing

A. Mission Description and Budget Item Justification

significantly change how BMD develops future systems. The technologies pursued include: next generation sensors, power, information processing, optics, advanced objectives of these investments are to provide: (1) component technologies that offer improved performance or reduced costs for BMDO acquisition programs; (2) a materials, propulsion and communication. This project causes and exploits breakthroughs in science that will keep BMD at the foremost edge of what is possible. A better understanding of the physical processes to support these acquisition programs; and (3) technical solution options to mitigate unpredicted threats. Unlike other To prepare to meet critical future active defense needs, advanced technology programs invest in an aggressive program of high leverage technologies that yield markedly improved capabilities across a selected range of boost phase and terminal defense interceptors, advanced target sensors, and innovative science. The BMDO projects that fund near term technology and testing efforts, this advanced technology initiative invests seed money in high-risk technologies that could primary project goal is to conduct proof-of-concept demonstrations that transition technology to development programs. Many of today's baseline technologies on BMDO systems like Theater High Altitude Area Defense (THAAD), Patriot Advanced Capability (PAC3), and Ground Based telluride ultra-sensitive infrared detectors; 32-bit radiation hardened Reduced Instruction Set Computer (RISC) processors for image analysis; composite materials for lightweight satellite structures; interferometric fiber-optic gyroscopes for sophisticated guidance and control; and solid-state gallium arsenide transmitter/receivers for Radar (GBR) are available due to the wise investment in innovative technologies some 10 years ago. Examples include: indium antimonide and mercury cadmium BMDO radars. The IST program is the only R&D program in the Defense Department focused on future BMDO technical requirements.

RD.	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) DATE February 1997	7(
вирсет Астіліту 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Technologies - Applied Research	РРОЈЕСТ 1651
EY 1996 (\$ in Thousands) - \$16,898 Battl Battl Battl Battl Battl Battl Battl Com Mod Com Flig Flig Flig Flig Flig Flig Flig Flig	Battle Management/Command, Control and Communications (BM/C3): Invested in advanced FPA; Light Detection and Ranging (LIDAR); sensor fusion prototype for target handover and multi-sensor fusion; and missile signatures. Began development of affordable water scale associative string processor (WASP) supercomputer capable of 50 GOPS per second. Continued to develop the superconducting terahertz condends for the communication multiple access communication is serviced in laser diddes for communication; laser satellite communication system using an air-to-ground link to demonstrate free-space communications modern. Flight tested the laser statellite communication systems; terahertz communication spread-spectrum. CDMA communications modern. Flight tested the laser statellite communication system using an air-to-ground link to demonstrate free-space communications and at a rate sgreater than 1 ggabaty per second. Began development of fast farms escher (2 kHzb) real-time -3.D read-out from 5 devels focal plane array into a next generation, artificial neural network special purpose computer capable of 1022 intercomneds per second index of conflane array into a next generation, artificial neural network special purpose computer capable of 1022 intercomneds per second index of safe for and fuse of carrier vehicles, and established miss distance. Demonstrated real-time sensor data fusion of angle-angle radar data and participate in US-Australian real-time sensor data fusion communication experiment. Provided an Australian real-time state and and and for teal-time transmission to US. Materials: Continued the development of wide band-gap semiconductors for non-volatile memory and advanced ultraviolet sensors. Continued quantum-well focal-plane array with a monolititic redout and the associated optics into a completed camera system. Sensors: Continued the Reb projects on dual-band solar blind detectors and processing testhed for pre-launch and ultraviolet detectors, including multi-spectral capabilities. Field demonstrated in	R); z z z modem. greater a next anal rV-4, and tring ed in ring gets gration ated of 1.5
Project 1651	Page 4 of 11 Pages Exhibit R-2 (PE 0602173C)	



RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) February 1997
вирсет астіміту 2 - Applied Research	
- \$7,592 - \$47,852	Power: Continued IST advances in wide band-gap materials for high-power electronic devices to reduce the weight and volume of ground-based radar power supplies. Completed flight qualification testing of a SCARLET array designed for operation in high radiation environments. The array was designed, fabricated, qualified, and integrated in the spacecraft, and launched in a total of only 9 months. Initiated design of a 2.6 kW advanced SCARLET array to provide power to NASA's first New Millennium Deep Space spacecraft. Completed design of advanced SCARLET array for the New Millennium flight demonstration with specific power of >50 W/kg using 24% efficient multiple band-gap photovoltaic cells. Delivered the engineering prototype of the photovoltaic flight solar cell. Assessed the conceptual feasibility of a cryogenic ground based radar system using a high temperature superconducting (HTS) generator. Initiated fabrication of the HTS coils for the power system demonstrator.
FY 1997 (\$ in Thousands): - \$19,597 BM/c image	BM/C3: Test the fast framing seeker in a real interceptor scenario to test its ability to do passive discrimination. Invest in neural networks for image recognition, optical image processing, multi-sensor tracking. Invest in ultra-stable laser diodes for optical communication; laser satellite communication systems; terahertz communication sources, and spread-spectrum CDMA communications modern.
- \$13,166 - \$4,160	Materials: Advance the development of wide band gap semi-conductors, targetinggainum mittide and sincon caroluc, and establishing a facility specifically for material growth and material characterization research. Begin development of advanced optical polymers to be used in 10 wavelength transmitters to achieve 1 terabit/sec transmission rate. Sensors: Demonstrate Fast Frame Seeker capability against simulated infrared missile targets in a gimbaled test cell. Invest in flying sensor and processing prototype for pre-launch and boost-phase targets (VIGILANTE); advanced 3-dimensional neural coprocessor; software library for
- \$5,072	ngn-speed autonance target recognition. Propulsion: Invest in high-impulse solid propellants, electric propulsion thrusters; and propellant manufacturability, for hypervelocity interceptors. Flight test the stationary plasma thrusters in space for satellite orbital transfer and orbit plane adjustment.
- \$14,014	Power: Complete demonstration of a high temperature superconducting (HTS) generator. Complete development of an advanced power design for a Gallium Nitride Microwave amplifier, and conduct a Gallium Nitride field effect transistor (FET) performance test. Complete design of a cryo GBR power conditioning system. Initiate thermal system design for complete cryogenic radar system including TR modules, power conditioning system, power generation system, and staged cryogenic cooling system.
- \$56,009	Total
FY 1998 (\$ in Thousands): - \$21,836 BM/(optic	isands): BM/C3: Invest in neural networks for image recognition, optical image processing, multi-sensor tracking. Invest in ultra-stable laser diodes for optical communication; laser satellite communication systems; terahertz communication sources; and spread-spectrum CDMA communications modem, as progress warrants.
Project 1651	Page 5 of 11 Pages Exhibit R-2 (PE 0602173C)

	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) PATE February 1997	26(
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602173C Support Technologies - Applied Research	PROJЕСТ 1651
- \$8,801	Materials: Invest in wide band-gap semiconductors; polymer-based electronics; digital superconducting electronics; non-volatile random access memory; and diamond windows and coatings. Demonstrate prototype GaN-based high microwave power amplifier operated at 300 degrees Centiorade	n access rees
- \$5,116	Sensors: Complete HTS design of integrated cryogenic GBR system prototype. Complete fabrication of 500 kW prototype cryogenic power conditioning system for GBR. Complete thermal system design for prototype system. Demonstrate Fast Frame Seeker capability against simulated infrared missile targets in a gimbaled test cell. Perform integrated demonstration of sensor and processing prototype for pre-launch and boost-phase targets (VIGILANTE); demonstrate against ground and airborne TMD targets using both hyperspectral and multispectral	ower st aunch al
- \$5,187 - \$9,983	Capability. Propulsion: Invest in high-impulse solid propellants; electric propulsion thrusters; and propellant manufacturability. Power: Complete SCARLET ground qualification and acceptance testing. Complete integrated New Millennium spacecraft system ground qualification with SCARLET array wings in launch and initial operation of SCARLET in space. Initial report on flight system performance in grane completed Invest in advanced switching for radar. high-efficiency solar cells and concentrators, and miniature intercentor outdance.	nd ance in
- \$50,923	technology. Demonstrate a GaN-based high microwave power amplifier, operated at 300 degrees C. Total	
EX 1999 (\$ in Thousands): - \$21,503 BMC	Thousands): BMC3: Invest in neural networks for image recognition, optical image processing, multi-sensor tracking and miniature interceptor guidance technology. Invest in ultra-stable laser diodes for optical communication; laser satellite communication systems; terahertz communication	ance on
- \$8,614	sources; and spread-spectrum CDMA communications modern, as progress warrants. Materials: Continue to invest in wide band-gap semiconductors; polymer-based electronics; digital superconducting electronics; non-volatile random access memory; and diamond with lows and continue as technical process and system technology needs warrant	latile
- \$5,040	Sensors: Continue to invest in sensor fusion and advanced neural network image recognition, as technical progress and system technology needs warrant.	gy needs
- \$5,602	Propellants: Continue to invest in high-impulse solid propellants; electric propulsion thrusters; and propellant manufacturability, as technical progress and system technology needs warrant.	mical
- \$9,335 - \$50,094	Power: Continue to invest in a power conditioning system for radar, high-efficiency solar cells and concentrators as technical progress and system technology needs warrant. Total	pu
Acquisition St competitively	Acquisition Strategy: This R&D program receives proposals in response to an annual Broad Agency Announcement of research opportunities. Proposals received are competitively judged according to BMD relevance, cost, and capabilities of the offeror. Strong emphasis is placed on the dual-use nature of the proposed effort.	ceived are ort.
Project 1651	Page 6 of 11 Pages Exhibit R-2 (PE 0602173C)	





RDT&E BUDGET ITEM JUSTIFI	CATION SHI	JUSTIFICATION SHEET (R-2 Exhibit)	bit)	DATE February 1997	
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER A 0602173C Research	I岁	ਮਸਸਦ Support Technologies - Applied	PROJECT Applied 1651	ест 1
B. Program Change Summary (\$ in Thousands)				Ę	
Ħ	FY 1996 FY 1997 47,800 47,449 57,449	X 1997 FY 1998 47,449 52,393 57,449	FY 1999 51,563	Total <u>Cost</u> 199,205	
Adjustments to Appropriated Value: a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	-1, 	-1,109 -331 56,009 50,923	50,094	204,878	
Change Summary Explanation: Funding: FY97 Congressional Plus-up for wide band-gap semiconductor research initiative Schedule: None Technical: None	conductor research	nitiative			
C. Other Program Funding Summary (8 in Thousands)				Ę	Total
FY 1996 FY 1998 FY 1999 FY 2000 FY 2001 FY 2002 FY 2003 Compl 2,233 The IST program acts as a creator of new technology for BMD. It feeds into all of the other BMDO technology programs and it acts as a catalyst to transition devices and components whose efficacy has been demonstrated under IST sponsorship into other advanced development programs.	EY 1997 EY 1998 2,233 feeds into all of the othe isorship into other advan	FY 1999 FY 2000 r BMDO technology l	FY 2001 FY 2002 programs and it acts as a grams.	2,233 Compl 2,233 as a catalyst to transition devices	Cost 2,233 and
D. Schedule Profile FY 1996	4 1 2	EY 1997 2 3 4 1	EY 1998 2 3	FY 1999 4 1 2 3	4
SKIPPER launch Deliver Lasercom System for STRV-2 RHETT II hardware delivery SWARM reticle seeker tracking demo Wafer-Scale Associative String Processor Demo	***				
Project 1651	Page 7 of 11 Pages	Pages	Ш	Exhibit R-2 (PE 0602173C)	

RDT&E BUDGET ITEM JI	USTIFIC/	\TIOI	JSTIFICATION SHEET (R-2 Exhibit)	R-2 E)	chibit	<u>.</u>		Dγ	DATE F.	February 1997	/ 1997
BUDGET ACTIVITY 2 - Applied Research			PE NUMBER AND TITLE 0602173C SUPP Research	Support Technologies - Applied	rt Tec	hnold	gies -	Appl	ed		PROJECT 1651
EY. 1	1996 3 4	-	FY 1997 2 3	4	_	F ~	398	4	_	FY 1999 2	3 4
4 Khit Nonvolatile Random Access	, ,										
Memory in Silicon Carbide Demo											
ISTEF THAAD tests support	×						×				
Integrate 3D chip stack version			×								
VIGILANTE electronics			÷								
ISTEF Red Tigress III data collection			* <								
oscillator tested			•								
Mass Optical Storage demo			×								
Adv Signal Processor Prototype delivered			×								
Start preliminary VIGILANTE flights			×								
Integrate first VIGILANTE chip set in lab			×								
HTS generator demonstration			×								
Gallium Nitride FET performance test			×	į							i
Deliver sensor package for EFEX 1,2				×	;						×
SCARLET Array wings integrated with					×						
New Millennium spacecraft						;					
Demonstrate cryo transmit and receive						×					
tubes for GBR							;				
RHETT II flight test							×	ì			
Cryo GBR power conditioning sys dem								× ;			
SCARLET solar array flight test								≺;			
Non-Linear Optics device demo	•							×		į	
NF2 propellant demo										×	
Voxel Cruncher delivered											×
Cryo GBR 1 MW generator demo											×
Load THAAD motor case with energetic											×
elastomers propellant and characterize											
under operational conditions.											
Laser materials device decision											×
		1					,	:			
Project 1651		7.48	rage & of 11 rages					XUIDIL	4.2 PT	EXNIBIT K-Z (PE U6UZ1/3C	(25)



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhibit)	DATE February 1997
вирсет Астіvіту 2 - Applied Research		
1 2 3 4 1 Advanced HWIL testbed demo at NRL	FY 1997 2 3 4 1 2 3	. FY 1999 4 1 2 3 4 X
Project 1651	Page 9 of 11 Pages	Exhibit R-2 (PE 0602173C)

DT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	TEM JUS	TIFICA	TION SF	HEET (R	-2 Exhi	bit)		DATE Fet	February 1997	26
BUDGET ACTIVITY 2 - Applied Research			PENL 060 Res	PE NUMBER AND TITLE 0602173C Supp	upport T	PE NUMBER AND TITLE 0602173C Support Technologies - Applied Research	gies - Ap		-	РВОЈЕСТ 1660
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1660 Statutory and Mandated Programs	48,240	46,501	51,009	45,394	2 -	40,750	36,038	34,905	Continuing	Continuing
A. Mission Description and Budget Item Justification To prepare for critical future active defense needs, advanced technology programs will invest in a balanced program of high leverage technologies that yield improved capabilities across a selected range of boost phase and terminal missile defense interceptors, advanced target sensors, and innovative science. The objectives of these investments are component technologies with improved performance or reduced costs for acquisition programs, and technical solution options to mitigate advanced and unpredicted threats. Under this project, the SBIR and STTR programs explore innovative concepts pursuant to PL 102-564 which mandates a two phase competition for small businesses that are developing innovative technologies. Emphasis is placed on dual use technologies for future BMDO needs. Dual use means that the technologies will also be judged on their potential for future private sector investment, both as a vehicle for reducing development time and unit cost of new BMDO technologies as a route to national economic growth through new commercial products.	tification e needs, advanced st phase and termi vith improved per e SBIR and STTF novative technole otential for future	d technology inal missile d formance or t programs e gies. Emph private sect	programs w lefense inter reduced cosi xplore innov asis is placec or investmen	rill invest in ceptors, adva ts for acquis rative concel I on dual use it, both as a rats.	a balanced purced trition programots pursuant technologie vehicle for r	ranced technology programs will invest in a balanced program of high leverage technologies that yield improves terminal missile defense interceptors, advanced target sensors, and innovative science. The objectives of these defense enterced costs for acquisition programs, and technical solution options to mitigate advanced an STTR programs explore innovative concepts pursuant to PL 102-564 which mandates a two phase competition shologies. Emphasis is placed on dual use technologies for future BMDO needs. Dual use means that the future private sector investment, both as a vehicle for reducing development time and unit cost of new BMDO neugh new commercial products.	igh leverage innovative: nical solutio 64 which m BMDO nece	technologie science. The n options to andates a two ds. Dual use ne and unit c	s that yield i e objectives of mitigate advo o phase com e means that	mproved of these anced and petition the
FY 1996 (\$ in Thousands): - \$11,240	id STTR awards to d STTR awards to	o 90 firms. 38 firms.								
FY 1997 (\$\\$\) in Thousands): - \$11,3' 200 Phase I SBIR and STTR awards to 140 firms. - \$35,134 60 Phase II SBIR and STTR awards to 50 firms. - \$46,501 Total	d STTR awards to d STTR awards to	o 140 firms. o 50 firms.								
FY 1998 (\$\\$\) in Thousands): - \$10,558 200 Phase I SBIR and STTR awards to 150 firms. - \$40,451 55 Phase II SBIR and STTR awards to 70 firms. - \$51,009 Total	d STTR awards to d STTR awards to	, o 150 firms.								
FY 1999 (\$\subseteq\$ in Thousands): - \$9,119 160 Phase I SBIR and STTR awards to 130 firms. - \$36,275 58 Phase II SBIR and STTR awards to 62 firms.	d STTR awards to d STTR awards to	o 130 firms.								
Project 1660			Page 10 of 11 Pages	11 Pages			Exhibi	Exhibit R-2 (PE 0602173C)	602173C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-	2 Exhibit)		DATE February 1997	266
вироет астіvіту 2 - Applied Research	PE NUMBER AND TITLE 0602173C Supp Research	^{LE} pport Techr	Support Technologies - Applied	·	РРОЈЕСТ 1660
- \$45,394 Total		nent of recearch	Proportinities Pro	nosals received are jud	ged
Acquisition Strategy: These competitively awarded programs are in response to annual announcement of research of programs are in response to according to technical and commercial potential.	to aminai amiounoo)
B. Program Change Summary (\$ in Thousands)					
FY 1996 Previous President's Budget Annountated Value	FX 1997 46,574 46,574	FY 1998 34,066	F <u>Y 1999</u> 35,139 1	Total <u>Cost</u> 157,209	
Adjustments to Appropriated Value: Adjustments to Appropriated Value: a. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	-73 46,501	51,009	45,394	191,144	
Change Summary Explanation: Funding: Funding changes in Advanced Technology Development (0603173C) and in Applied Research (0602173C) are based on guidance stated in PL102-564. Schedule: None Technical: None	173C) and in Applied	l Research (0602	173C) are based o	n guidance stated in PL	.102-564.
C. Other Program Funding Summary (\$ in Thousands) FY 1996 FY 1997 FX	EY 1998 FY 1999	FY 2000 FY	FY 2001 FY 2002	To EY 2003 Compl	Total Cost
D. Schedule Profile			000	0001 XH	
EY 1996 1 2 3 4 1 SBIR/STTR X X	FX 1997 2 3	4 - X	r 1228 2 3 4	x x 3	4
Project 1660	Page 11 of 11 Pages		Exhit	Exhibit R-2 (PE 0602173C)	

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	RDT&E BUDGET ITEM		TIFICAT	FION SE	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Fet	February 1997	97
BUDG 3-7	BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NC 060	PE NUMBER AND TITLE 0603173C Supp	ve NUMBER AND TITLE 0603173C Support Technologies - ATD	echnolo	gies - AT	D		
	COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	130,611	251,294	147,557	144,902	147,142	151,398	156,360	159,915	Continuing	Continuing
1155	1155 Phenomenology Program	2,410	18,309	26,740	26,205	20,401	21,204	22,399	22,926	Continuing	Continuing
1161	Advanced Sensor Technology	19,326	32,797	24,527	22,743	19,723	18,921	16,995	25,566	Continuing	Continuing
1270	1270 Adv Interceptor Materials and Systems Tech	26,788	68,409	31,492	29,412	42,890	46,133	49,460	42,449	Continuing	Continuing
1360	1360 Directed Energy Program	76,488	95,930	28,877	28,539	28,222	27,631	28,224	28,886	Continuing	Continuing
1651	1651 Innovative Science and Technology	0	2,233	0	0	0	0	0	0	ТВD	TBD
1660	1660 Statutory and Mandated Programs	5,399	4,707	4,161	4,113	4,073	4,051	4,293	4,299	Continuing	Continuing
3352	Modeling & Simulations	0	2,002	1,554	1,898	643	1,512	1,544	1,582	Continuing	Continuing
4000	4000 Operational Support	200	26,907	30,206	31,992	31,190	31,946	33,445	34,207	Continuing	Continuing

A. Mission Description and Budget Item Justification

able to respond to a changing environment and an evolving global missile threat. The program advances the state-of-the-art in those critical functions, components, and subsystems necessary to increase system performance, reliability, maintainability and survivability while reducing acquisition and life cycle cost. This program directly defense guidance priorities, a focused, robust component and advanced concept technology development program must be maintained to position the Department to be responsibility for BMD unique and high leverage technology development rests solely with BMDO within the Department of Defense. In order to meet long range The BMD supporting technology program develops concepts and components for next generation and product improved ballistic missile defense systems. The supports those critical related technologies for next generation BMD Systems.

The BMD technology program is designed to provide answers to many key R&D issues for developmental and future Theater and National Missile Defense systems. BMDO crafts the program as a component of the overall Department technology area plan. The efforts include: Development of prediction tools to generate high-confidence target signatures for BMD, a critical adjunct to the evaluation of BMD system performance across the full spectrum of threats and engagement scenarios (Project 1155)

Page 1 of 38 Pages

Exhibit R-2 (PE 0603173C)

February 1997 0603173C Support Technologies - ATD RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) PE NUMBER AND TITLE 3 - Advanced Technology Development

Advanced sensor technology development which is needed to detect, track, discriminate, and intercept advanced (post-2000) BMD threats. This includes targe

- The Advanced Interceptor Materials and Systems Technology (AIMST) program develops and demonstrates the following for interceptor and space surveillance systems: advanced interceptor sensor processing and power components; multifunctional material and structures; low cost interceptor composite manufacturing processes; and low cost flight test demonstrations. These technologies are critical to the deployment of effective, affordable TMD and NMD systems (Project object map generation on board interceptors, the detection and tracking of low observable targets, and other high leverage sensor technologies (Project 1161).
- The culmination of advanced chemical laser systems technologies (Project 1360) to demonstrate integration of high power laser beam with large optics and transition to technology based advances with ground integration efforts.
- and industrial sectors, and to affirmatively incorporate historically minority and black colleges and universities in development of BMD technology (Project 1660). This program also includes important mandated outreach efforts to encourage Small Business Innovation Research, to transition BMD technology to commercial
 - alternative, and demonstrated performance capabilities of Theater Missile Defense (TMD) and National Missile Defense (NMD) systems. These large and complex M&S tools require high-performance vector and parallel processing supercomputers, scalar processors, and advanced graphic workstations for operation (Project Provide for the development/modification and validation of modeling and simulation (M&S) techniques and tools that are critical in assessing the projected,
 - Includes manpower authorizations and the associated costs specifically identified and measured to the performance of these program (Project 4000)

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy. Further justification of the Budget Activity code assigned to each Program Element is contained within the Brief Description of Element section of each Program Element Summary.

FY 1996 Accomplishments: See individual R-2 project summaries.

FY 1997 Plans: See individual R-2 project summaries.

FY 1998 Plans: See individual R-2 project summaries. FY 1999 Plans: See individual R-2 project summaries.

Acquisition Strategy: See individual R-2 project summaries.

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Exhibit R-2 (PE 0603173C)

RDT&E BUDGET ITEM JUSTII	FICATIO	JUSTIFICATION SHEET (R-2 Exhibit)	R-2 Exhibi	it)	DATE February 1997
BUDGET ACTIVITY 3 - Advanced Technology Development		PE NUMBER AND TITLE 0603173C Supp	Support Te	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	АТБ
B. Program Change Summary (\$ in Thousands)	FV 1996	FV 1997	FV 1998	FV 1999	Total Coet
Previous President's Budget Appropriated Value	125,537	132,319	157,629	150,345	565,830
Adjustments to Appropriated Value: a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	130,611	-9,999 1,026 251,294	147,557	144,902	674,364
Change Summary Explanation: Funding: Over the past few years, in compliance with congressional direction and in consonance with the Bottom-Up Review findings, the Department has significantly restructured the follow-on supporting technology program for ballistic missile defense. Today, BMDO management is highly focused on those technologies that directly support TMD and NMD systems developments, or hold significant promise for advanced missile defense systems. In instances where those programs have significant collateral application to other military missions, technical information is shared with the interested military department. The ongoing advanced technology program supports DoD's long-term commitment to continue, at a stable level, critical research on technologies that build on work to date in order to prepare for more capable and affordable active ballistic missile defense systems. This submission incorporated minor realignments of work effort between sensor and interceptor technologies to take advantage of project synergies. Additionally, the directed energy program continues through the FYDP to provide the technological base advances essential to ready robust responsive threat options.	ressional direc gy program fo developments, er military mi g-term commi ive ballistic m ive ballistic m	with congressional direction and in conso; technology program for ballistic missile systems developments, or hold signification to other military missions, technical ioD's long-term commitment to continue rdable active ballistic missile defense syste advantage of project synergies. Additito ready robust responsive threat options.	mance with the Islands. Today in promise for ac information is she, at a stable leve tems. This submonally, the directionally, the directional is she is the information is should be the information in th	Sottom-Up Revier, BMDO manage Ivanced missile cared with the interpretation incorporated energy programments.	with congressional direction and in consonance with the Bottom-Up Review findings, the Department has technology program for ballistic missile defense. Today, BMDO management is highly focused on those systems developments, or hold significant promise for advanced missile defense systems. In instances where ion to other military missions, technical information is shared with the interested military department. The ioD's long-term commitment to continue, at a stable level, critical research on technologies that build on work to dable active ballistic missile defense systems. This submission incorporated minor realignments of work effort e advantage of project synergies. Additionally, the directed energy program continues through the FYDP to ready robust responsive threat options.
Schedule: See individual R-2s.					
Technical: See individual R-2s.					
C. Other Program Funding Summary (\$ in Thousands)					
See Individual Project R-2 Exhibits					
D. Schedule Profile					
See Individual Project R-2 Exhibits					
	Pag	Page 3 of 38 Pages		Ш	Exhibit R-2 (PE 0603173C)

RDT&E BUDGET ITEM	SUL ME	TIFICA	TION S	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Fet	February 1997	16
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NI 060	PE NUMBER AND TITLE 0603173C Supp	IITLE Support T	echnolog	E NUMBER AND TITLE J603173C Support Technologies - ATD		<u>а</u> Т	^э ROJEСТ 1155
COST (\$ In Thousands)	FY 1095 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1155 Phenomenology Program	2,410	18,309	26,740	26,205	20,401	21,204	22,399	22,926	Continuing	22,926 Continuing Continuing

A. Mission Description and Budget Item Justification

To prepare for critical future missile extense needs, advanced technology programs will conduct a balanced program of high leverage technologies that yield improved objectives of these investments are subsystems with improved performance or reduced costs for acquisition programs, and technical solution options to mitigate capabilities across a selected range of boost, midcourse, and terminal phase missile defense interceptors, advanced target sensors, and innovative science. The advanced and unpredicted threats.

adjunct to the evaluation of BMD system performance across the full spectrum of threats and engagement scenarios. This program provides data collection sensors and This program provides the U.S. with the data and predictive tools to generate high confidence target signatures for ballistic missile defenses (BMD). This is a critical instruments for use on live-fire missions and provides analysis of the resulting test data. This program provides predictive models of target signatures in both Radar and Infrared spectrums. This program evaluates and develops algorithms for the critical functions of discrimination, target handover, and aimpoint selection. This program provides for data storage and retrieval of all BMDO sponsored tests per statutory requirements.

Experiment (MSX) data. This effort will include analysis of the background data for its impact on current and future elements of the NMD program, especially the Space-based Phenomenology Program Database Development is the work to expand the database for background data through the analysis of Midcourse Space Space Based Infrared System (SBIRS)

emerging requirements for signature data collection capabilities. This program provides mission planning for all BMDO signature collection activities. These activities collection sensors will be conducted per the direction of OSD. This program develops responsive access to stored signature data. This program provides exploitation Data Collection is the program to provide effective and robust threat signature collection for ballistic missile defense programs. This program analyzes existing and include providing for the maximum use of existing high altitude data collection aircraft to collect ballistic threat signatures in all phases of flight. Signature data dissemination and modeling tie in with higher level simulations will be developed. Evaluation, development, and employment of several types of potential data of new signatures provided by emerging sensing techniques.

Project 1155

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Exhibit R-2 (PE 0603173C)

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RD	RDT&E BUDGET ITEM JUSTIFICATIO	JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 3 - Advanced Tech	BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	РРОЈЕСТ 1155
FY 1996 (\$ in Thousands): - \$2,410 Techstands studicular studicul	ands): Technical Analysis: Provided BMDO with the specialistudies of the cost, schedule, and technical risks of alter long-range program planning, technical and programme efforts of the TMD program. Supported BMDO in all a analysis in optical and radar areas of the spectrum.	uds): Technical Analysis: Provided BMDO with the specialized support required to resolve development and deployment issues, including trade studies of the cost, schedule, and technical risks of alternative deployment readiness options. Provided special studies and reviews involving long-range program planning, technical and programmatic issues such as methods to maximize NMD deployment by leveraging development efforts of the TMD program. Supported BMDO in all aspects of battlespace environment discrimination issues including scientific studies and analysis in optical and radar areas of the spectrum.	ent issues, including trade idies and reviews involving t by leveraging development icluding scientific studies and
FY 1997 (\$ in Thousands): - \$5,253 Space users. missi - \$13,056 Data BMD signa - \$18,309 Total	Space-based Phenomenology Program Database Develousers. Provide for data collection, reduction, and sensor missiles during boost, mid-course, and terminal phases on Data Collection: Analyze existing and emerging require BMDO signature collection activities. Perform signature signature data and modeling to higher level simulations. Total	Space-based Phenomenology Program Database Development: Collect and analyze background data from the MSX to support SBIRS and other users. Provide for data collection, reduction, and sensor development to collect spectral data on natural backgrounds and signatures of ballistic missiles during boost, mid-course, and terminal phases of flight including the use of existing high altitude aircraft. Data Collection: Analyze existing and emerging requirements for signature data collection capabilities. Perform mission plauning for all BMDO signature collection activities. Perform signature collection missions using existing high altitude aircraft. Develop approach to tie signature data and modeling to higher level simulations. Total	SX to support SBIRS and other inds and signatures of ballistic t. mission planning for all Develop approach to tie
EY 1998 (\$ in Thousands): - \$4,517 Space (SBII prom - \$22,223 Data collect for al	Space-based Phenomenology Program Database Development: Analyze background data from Space-based Phenomenology Program Database Development: Analyze background and target (SBIRS) and other users. Provide mission support costs for high altitude background and target promising Long Wavelength Infrared (LWIR) sensor/processor technologies for discrimination. Data Collection: Continue analysis of existing and emerging requirements for signature data collection collection capabilities at the laboratory level. Acquire mission capable signature data collectors for all BMDO signature collection activities. Perform signature data collection missions using a Implement approach to tie signature data and modeling to higher level simulations.	Space-based Phenomenology Program Database Development: Analyze background data from the MSX to support Space Based Infrared System (SBIRS) and other users. Provide mission support costs for high altitude background and target spectral measurements. Develop and transfer promising Long Wavelength Infrared (LWIR) sensor/processor technologies for discrimination. Data Collection: Continue analysis of existing and emerging requirements for signature data collection capabilities at the laboratory level. Acquire mission capable signature data collectors to meet requirements. Perform mission planning for all BMDO signature collection activities. Perform signature data collection missions using existing signature data collection aircraft. Implement approach to tie signature data and modeling to higher level simulations.	ort Space Based Infrared System ments. Develop and transfer les. Demonstrate signature data nents. Perform mission planning data collection aircraft.
FY 1999 (\$ in Thousands): - \$4,503 Space Provi (LWI	sands): Space-based Phenomenology Program Database Develop Provide mission support costs for high altitude backgroun (LWIR) sensor/processor technologies for discrimination.	unds): Space-based Phenomenology Program Database Development: Analyze background data from the MSX to support SBIRS and other users. Provide mission support costs for high altitude background and target spectral measurements. Continue developing and transferring promising (LWIR) sensor/processor technologies for discrimination.	ort SBIRS and other users. ing and transferring promising
Project 1155	Pag	Page 5 of 38 Pages Exhibit	Exhibit R-2 (PE 0603173C)

RDT&E BUDGET I TOWN IN		FICAT	ION SH	EET (R.	CATION SHEET (R-2 Exhibit)	it)		DATE Febr i	February 1997	
BUDGET ACTIVITY 3 - Advanced Technology Development	,	,	PE NUN 0603	PE NUMBER AND TITLE 0603173C Supp	TLE Jpport Te	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	ies - ATE		PROJECT 1155	PROJECT 1155
 \$21,702 Data Collection Platform: Continue analysis of existing and emerging requirements for signature data collection capabilities. Demonstrate signature data collection capabilities at the laboratory level. Acquire mission capable signature data collections to meet requirements. Perform mission planning for all BMDO signature collection activities. Perform signature collection missions using upgraded signature data collection aricraft. Demonstrate approach to tie signature data and modeling to higher level simulations. \$26,205 Total 	Continue and apabilities at MDO signatu roach to tie si	lysis of exis he laborator re collection gnature data	sting and emry level. Actactivities.	lerging requiredure mission berform signing to higher	rements for n capable signature collectevel simula	signature da gnature data tion mission itions.	ta collection collectors to s using upgi	capabilities. meet requires aded signatur	Demonstrat ments. Perf e data collec	orm tion
Acquisition Strategy: This project funds its efforts through executing agents in the Air Force, Army, Navy and BMDO via existing contracts.	rts through ex	ecuting age	nts in the A	ir Force, Arı	ny, Navy an	d BMDO vi	a existing co	ntracts.		
B. Program Change Summary (\$ in Thousands)										
Previous President's Budget Appropriated Value		EY 1996 1,539	ĬΉ	<u>Y 1997</u> 13,931 13,931	EY 1998 27,078	EY 1999 26,670		Total Cost 69,218		
a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) c. Internal BMDO Adjustments Current Budget Submit/President's Budget		2,410	•	-184 -71 4,633 18,309	26,740	26,205		73,664		
Change Summary Explanation: Funding: Increase in funding FY 96 to FY 97. Explanation: 1) MSX data analysis moved into this project beginning in FY 97, 2) Effort to increase quantity and quality of signature data collection and analyses. Funding: Increase in funding FY 97 to FY 98. Explanation: Demonstration and acquisition phase of the effort to increase quantity and quality of signature data collection and analyses. Schedule: None Technical: None	77. Explanati yses. 88. Explanati	on: 1) MS¾ on: Demons	C data analy: stration and	sis moved in acquisition <u>I</u>	ito this proje chase of the	ct beginning effort to inci	in FY 97, 2 case quantit) Effort to inc y and quality	rease quanti of signature	ty and data
C. Other Program Funding Summary (S in Thousands)	sands)									
2400 NMD, PE 0603871C 1155 Phenomenology Program, PE 0603872C	EY 1996 730,656 36,908	EY 1997 828,864 31,338	EY 1998 504,091 37,835	EY 1999 393,085 38,622	FY 2000 309,748 37,464	EY 2001 309,584 37,300	EY 2002 391,858 37,205	FY 2003 392,433 36,490	To Compl Cont	Total Cost Cont Cont
Project 1155			Page 6 of 38 Pages	8 Pages			Exhibit	Exhibit R-2 (PE 0603173C)	03173C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	FICATIO	N SHEET (R-2 E	xhibi				DATE F.	February 1997	ry 19	16	
BUDGET ACTIVITY 3 - Advanced Technology Development		PE NUMBER AND TITLE 0603173C Supp	DTITLE Support Technologies - ATD	ort Tec	hnok	gies	ATD			F +	РRОЈЕСТ 1155	
D. Schedule Profile												
FY 1996	4 - ;	FY 1997 2 3	4	1	FY 1998 2 3	3 8	4	-	FY 1999 2 3	3	4	
Start MSX data analysis Analyze Signature Collection Reqmts Perform Data Collection Missions Upgrade Signature Data Collection Perform Signature Collection Demos	× × ×	** *	×× ×	××	×××	××××	××××	×××	×××	××××	××××	
	,											
Project 1155	Pag	Page 7 of 38 Pages					Xhibit I	R-2 (PE	Exhibit R-2 (PE 0603173C)	73C)		

RDT&E BUDGET ITEM	•	TIFICA.	TION SI	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fet	February 1997	197
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NI 000	PE NUMBER AND TITLE 0603173C Supp	E NUMBER AND TITLE 1603173C Support Technologies - ATD	echnolo	gies - AT	O	д Т	РРОЈЕСТ 1161
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1161 Advanced Sensor Technology	19,326	32,797	24,527	22,743	19,723	18,921	16,995	25,566	25,566 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

capabilities across a selected range of boost, midcourse, and terminal phase missile defense interceptors, and advanced target sensors, as well as advances in innovative To prepare for critical future active defense needs, advanced technology programs will conduct a balanced program of high leverage technologies that yield improved science. The objectives of these investments are subsystems with improved performance, reduced costs for acquisition programs, and technical solution options to counter advanced and unpredicted threats.

2000) BMD threats. The technologies for ASTP were chosen through a technology requirements analysis driven by BMD missions, threats, system requirements, and The Advanced Sensor Technology Program (ASTP) is BMDO's principal advanced sensor program. ASTP is a joint Army, Navy, Air Force technology development and demonstration program, managed by BMDO. The purpose of ASTP is to provide the sensor technology needed to detect, track, and discriminate advanced (postschedules. Care was taken to avoid duplication with other programs both within and external to BMDO. Starting in FY1996, ASTP realigned interceptor-related echnology efforts under Project 1270 to correspond with their discriminating interceptor technology focus.

The three Services and BMDO are developing technologies in their Project Reliance areas of expertise. The Air Force is developing passive sensor technology, the Army - ladar technology, and the Navy - radar technology. These technologies will be infused from ASTP into BMDO core programs as they mature. In addition to development of critical component technologies, the three Services, in conjunction with BMDO, will combine these critical components in an integrated sensor for demonstrating data fusion by FY2001. Data from the passive, ladar and radar sensors will be combined (fused) in a BMDO-developed fusion processor for tracking and discrimination.

Real-time data fusion is a central focus of ASTP. It is identified by the technical requirements analysis as the best solution to the difficult signal processing problem. High-speed data fusion algorithms are under development by BMDO for this critical need.

FY97, when scaled rocket flights will provide initial collocated multi-sensor data for benchmarking of tracking algorithms. The first integrated demonstration of ASTP Laboratory and field demonstrations of ASTP technologies are being conducted throughout the program, starting with advanced focal plane imaging demonstrations beginning in FY00. Successful performance of the radar-to-system interface and tracking algorithms will signal the transition to the airborne demonstration phase, subsystems will be at the Pacific Missile Range Facility (PMRF), Kauai, Hawaii ground test facility, where radar and optical sensors will detect and track missiles conducted at White Sands Missile Range, NM (WSMR) in FY95. Larger experiments will permit fusion of radar, infrared, and ladar data beginning in FY96 and which begins in FY01.

Project 1161

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Exhibit R-2 (PE 0603173C)



		ebruary 1997
BUDGET ACTIVITY PE NUMBER AND TITLE		PROJECT
3 - Advanced Technology Development	hnologies - ATD	1161

BMDO has selected a Government system integration team led by Naval Research Laboratory/Navy Air Systems Team (NRL/NAST). This system integrator (SI) will oversee the installation of ASTP equipment at the test ranges, and will integrate the sensors and other equipment into the P-3 aircraft. Additionally, the SI will operate the ASTP equipment during the airborne demonstrations.

The technologies under development in ASTP are:

format with quantum efficiency approaching 30%. This technology is important due to its potential for high sensitivity, low noise, high uniformity imaging and Multiple Quantum Well (MQW) Focal Plane Arrays (FPA). MQW FPAs have made rapid progress in the past three years, and are now available in 256x256 low production cost. Simultaneous Multi-Color FPAs. FPAs capable of simultaneously measuring two or more Infrared (IR) wavebands will simplify sensor design for both surveillance and interceptor seekers. The result will be highly sensitive, discriminating sensors which are more reliable, lighter, and less costly than currently available

Smart FPAs. Pre-processing sensor data on or near the FPA greatly improves processing throughout. This provides the overall processing speed needed for reallime data fusion for accomplishing multiple target tracking, discrimination, and tracking low-observable targets in clutter.

Imaging Ladar. Miniature Laser Radar (ladar) integrated with passive sensors will allow precise tracking and discrimination of BMD targets. Ladar capable of range-doppler and 3-dimensional imaging are under development. Eye safe ladar is being developed for airborne applications. The ladar technology is also consistent with interceptor technology requirements. Radar. Reliable booster detection and tracking through cloud-cover requires radar observations. ASTP is leveraging an existing NRL airborne UHF surveillance radar technology program based on the APS-145 to demonstrate TBM detection and early ascent phase tracking. Transmit/Receive (T/R) Modules. The radar T/R Module program will develop and demonstrate technologies required to increase output power and power added efficiency, and reduce the noise figure of 10 Ghz (X-band) T/R modules for use in radars.

Real Time Data Fusion Algorithms. Techniques for combining (fusing) data for tracking multiple targets, discrimination, and sensor optimization are under development. The algorithms are critically needed as principal elements of the fusion processor. They are the central focus of the ASTP data fusion effort.

Russian American Cooperative Programs:

The RAMOS program is a cooperative effort with Russian scientists and engineers to exchange IR data acquired through remote sensing systems and to develop plans for future cooperative space experiments. This program investigates options to leverage off existing funded experiments to foster a closer working relationship at the technology level between both nations.

Project 1161

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Exhibit R-2 (PE 0603173C)

E	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) DATE February 1997
BUDGET ACTIVITY 3 - Advanced Te	3 - Advanced Technology Development 0603173C Support Technologies - ATD 1161
The AGRE 1 ground optic	The AGRE is an upper atmospheric joint research project with Russian scientist, using Russian launch vehicles and US/Russian on-board sensor packages, Russian ground optical/radar sites, and US MSX satellite to monitor experiments and collect data.
Down Under earl Australian Defen Australian Jindal identification usi	Down Under early Warning Experiment (DUNDEE). DUNDEE is a cooperative advanced BMD sensor and BMC/3 technology research demonstration with the Australian Defense Science Technology Organization (DSTO). Objectives are to perform research, demonstration, and post mission data reduction using the Australian Jindalee Over-the-Horizon Radar to detect TBM and Cruise Missile targets. Specific objectives include: wide area, timely launch detection; target identification using plume doppler signature; and trajectory association with satellite detection reports.
FY 1996 (\$ in Thousands): - \$5,865 Devedemo	nousands): Developed sensor integration requirements and begin system integration planning, demonstration planning, and simulation for ground demonstrations; allocated subsystem requirements to achieve performance enhancements beyond current NMD & TMD sensor capabilities, and developed airborne demonstration data and signal architecture.
- \$3,299	Performed sequential 2-color 256x256 MQW imagery demonstration, perform on-FPA processing demonstration. Performed 2-Color sequential MQW lab tests.
- \$1,748	Demonstrated eye-safe laser pump and 6m multiple-folded CO2 ladar.
- \$2,163 - \$1,254	Continued testing and integration of radar sensor and began development of ballistic missile defense mode. Completed planning, began development and testing of data fusion aborithms with system simulations.
- \$4,997	Defined terms of RAMOS agreement, planned near-term experiments. Began data exchange with Russia.
- \$19,326	Total
FY 1997 (\$ in Thousands): - \$10,233 Begin simul	Begin laboratory, ground, and chamber demonstrations of components, begin planning for flight demonstrations, begin system performance simulations, conduct system level system design review (SDR), conduct system Preliminary Design Review (PDR), and begin system design. Compare different Gallium Arsenide based structures, such as transistors, to determine optimum device structure for T/R modules and
- \$5,756	components. Develop and improve interceptor communications technologies, including conformal antenna array designs. Continue development, integration, and testing of passive IR components that are candidates for multi-sensor flight demonstration; demonstrate simultaneous 256x256 2-color MOW array at Army Missile Optical Range (AMOR), and deliver on-FPA electronics
\$1,678	Fabricate and deliver hardened eye-safe aluminum gallium antimonide arsenide detector for eye-safe ladar and demonstrate 2-D imaging.
- \$3,146 - \$1,783	Continue integration of radar sensor for multi-sensor flight demonstration. Develop and test fusion processing algorithms for tracking and discrimination from an airborne platform.
- \$8,846	Execute RAMOS near-term experiments, data reduction and analysis, and sensor feasibility studies. Execute AGRE-0 and AGRE-1 experiments and nest flight data analysis.
- \$1,355	Conduct DUNDEE design trades and execute acquisition and assembly of 3 sounding rocket targets. Provide ground assembly, testing, launcher acquisition, remote site transportation, in-theater launch support, and overall target management for the DUNDEE cooperative demonstration.
Project 1161	Page 10 of 38 Pages Exhibit R-2 (PE 0603173C)

RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhibit)	E February 1997
BUDGET ACTIVITY 3 - Advanced Tec	BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	РRОЈЕСТ 1161
- \$32,797	Total		
FY 1998 (\$ in Thousands):			
- \$10,806	Perform laboratory, ground, and chamber demonstration system performance simulations, complete system Critic	Perform laboratory, ground, and chamber demonstrations of integrated components; plan for sensor suite integration and flight demonstrations, system performance simulations, complete system Critical Design Review (CDR) and begin demonstration system fabrication and finalize	ı and flight demonstrations, abrication and finalize
- \$5,841	system interfaces. Continue development, integration, and testing of passiv 128x128 high-quantum-efficiency MQW array. Fabrica	system interfaces. Continue development, integration, and testing of passive IR components that are candidates for multi-sensor flight demonstration; demonstrate 128x128 high-quantum-efficiency MQW array. Fabricate 128x128 configuration on-FPA processing electronics brassboard for multi-sensor	demonstration; demonstrate assboard for multi-sensor
- \$3,221	flight demonstration. Continue development, integration, and airborne testing ASTP system to radar interface.	flight demonstration. Continue development, integration, and airborne testing of wide area search (WAS) APS-145 radar for multi-sensor flight demonstration. Test ASTP system to radar interface.	flight demonstration. Test
- \$2,691		ng of fusion processing algorithms and mapping real-time algorithms onto high performance computer (HPC) to active sensor handover at AMOR.	ormance computer (HPC)
- \$1,968 - \$24,527	Continue development and testing of eyesafe ladar. Total		
FY 1999 (\$ in Thousands):	sands):		
- \$10,202	Perform system performance simulations, complete subsystem fabrication and test system interface for ground tests at PMRF, Kauai, Hawaii, and test user interfaces/consoles and command software.	Perform system performance simulations, complete subsystem fabrication and test system interfaces, begin integration of demonstration system for ground tests at PMRF, Kauai, Hawaii, and test user interfaces/consoles and command software.	on of demonstration system
- \$5,889	Continue development, integration, and testing of Passiv	Continue development, integration, and testing of Passive Sensor Subsystem (PSS) for multi-sensor flight demonstration tests, perform	ation tests, perform
- \$1,973	Continue development, integration, and airborne testing of wide area search (WAS) APS-16 ASTP system to radar signal processor interface in preparation for ground testing at PMRF.	Continue development, integration, and airborne testing of wide area search (WAS) APS-145 radar for multi-sensor flight demonstration. Test ASTP system to radar signal processor interface in preparation for ground testing at PMRF.	flight demonstration. Test
- \$2,986	Benchmark testing of fusion processing algorithms on a configuration. Continue refinement of alternative tracki	Benchmark testing of fusion processing algorithms on wafer-scale signal processor (WSSP) co-processor as part of Intel Paragon (HPC) configuration. Continue refinement of alternative tracking and target discrimination algorithms to support system ground tests.	Intel Paragon (HPC) round tests.
- \$1,693	Final testing and delivery of eye-safe ladar following ground tests at AMOR, if for later integration into ASTP ground and airborne demonstration equipment.	Final testing and delivery of eye-safe ladar following ground tests at AMOR, integration of ladar into passive/active sensor subsystem (PASS) for later integration into ASTP ground and airborne demonstration equipment.	sensor subsystem (PASS)
- \$22,743	Total		
Acquisition Strateg Air Force is develo and testing. The A off of existing airbo	Acquisition Strategy: ASTP is a Tri-Service/BMDO program. The executing Air Force is developing passive IR technology (multi-color FPAs and on-FPA and testing. The Army is responsible for ladar technology development, integoff of existing airborne radar programs. BMDO is developing fusion processe conducting major flight demos. BMDO will initiate contracts to perform thes	Acquisition Strategy: ASTP is a Tri-Service/BMDO program. The executing agents will use existing contracts, and in-house resources to perform this program. The Air Force is developing passive IR technology (multi-color FPAs and on-FPA processing) and is responsible for passive sensor technology development, integration, and testing. The Airny is responsible for ladar technology development, integration, and testing. The Navy is developing radar technology development, integration, and testing. The Navy is developing to be service in the service of for existing airborne radar programs. BMDO is developing fusion processor technology and algorithms and is responsible for performing platform integration and conducting major flight demos. BMDO will initiate contracts to perform these efforts. Cooperation with on-going programs will be maximized to leverage funding.	o perform this program. The y development, integration, gy (bi-static) and is leveraging ing platform integration and imized to leverage funding.
Project 1161	Page	Page 11 of 38 Pages Exhibit R-2	Exhibit R-2 (PE 0603173C)

RDT&E BUDGET ITEM		IIFICAT	ION SH	JUSTIFICATION SHEET (R-2 Exhibit)	2 Exhib	jt)		DATE Feb	February 1997	7
BUDGET ACTIVITY 3 - Advanced Technology Development	ənt		PE NU 060:	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	TILE Upport Te	olouhoe	jles - AT		PR(PROJEСТ 1161
ASTP is an on-going program with many contracts in place. A coordinated team of management and technical personnel is now in place in the Army, Navy, and Air Force, managed by BMDO. Essential documentation has been prepared, and mission requirements have been analyzed, and flowed-down to ASTP component designs. Broad Agency Announcements have been published and proposals evaluated to ensure potential attractive technologies and innovative approaches have not been overlooked during the tri-service planning efforts. BMDO contracting efforts are in progress to initiate platform integration and sensor fusion.	acts in place. tation has be seen publishe efforts. BM	A coordina en prepared, d and propo DO contract	ted team of 1 , and mission sals evaluate ing efforts a	management n requiremen ed to ensure presere in progres	and technics its have been potential attr is to initiate	al personnel 1 analyzed, a active techn platform int	is now in pind flowed-cologies and egration and	lace in the Ar Iown to AST innovative ap sensor fusio	my, Navy, ar P component pproaches hav	id Air /e not
B. Program Change Summary (\$ in Thousands)										
Previous President's Budget		FY 1996 20,789	H	FY 1997 24,611	EY 1998 27,683	FY 1999 24,509		Total Cost 97,592		
Adjustments to Appropriated Value: a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) c. Internal BMDO Adjustments Current Budget Submit/President's Budget		19,326		-1,147 -57 -610 32,797	24,527	22,743		99,393		
Change Summary Explanation: Funding: Funding decrease in FY1996 results from refining the separation of technologies and efforts between Project 1161 and Project 1270. Schedule: None Technical: Sensor and interceptor technology efforts have been realigned within Projects 1161 and 1270, respectively, to better reflect the technologies' principal applications.	its from refini y efforts hav	ing the separ e been realig	ation of tech	mologies and Projects 116	d efforts beta l and 1270, 1	ween Projec respectively	t 1161 and F	roject 1270. flect the tech	nologies' prir	cipal
C. Other Program Funding Summary (S.in Thousands)	(spuds)									
1270 Applied Interceptor Materials and Systems	FY 1996 26,788	FY 1997 68,409	<u>FY 1998</u> 31,492	EY 1999 29,412	FY 2000 42,890	FY 2001 46,133	FY 2002 49,460	FY 2003 42,449	To Compl Cont	Total Cost Cont
1270 Applied Interceptor Materials and Systems Technology, DE 0601872	9,137	0	0	0	0	0	0	0	TBD	TBD
1360 Directed Energy Programs, PE 0603173C 2400 NMD Program, PE 0603871C 3360 Test Resources, PE 0603872C	76,488 730,656 31,139	95,930 828,864 35,507	28,877 504,091 30,888	28,539 293,085 30,201	28,222 309,748 29,942	27,631 309,584 29,793	28,224 391,858 30,312	28,886 392,433 30,363	Cont Cont	Cont
Project 1161			Page 12 of 38 Pages	38 Pages			Exhibi	Exhibit R-2 (PE 0603173C)	303173C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Technologies	PROJECT S - ATD 1161
D. Schedule Profile		
FX 1996 1 2 3 4 1	EY 1997 2 3 4 1 2 3	FY 1999 4 1 2 3 4
Sequential 2-color 256x256 MQW X Imagery Demonstration		
Define Terms of RAMOS Agreement Eyesafe Ladar Pump Demo X		
Simultaneous 2-color 256x256 MQW Imagery Demonstration	×	
Demonstrate FED smart windowing Evesafe I adar 2-D imaging demo	××	
Hardened Eyesafe Solid-State Ladar	×	
System-level PDR; interface requirements	×	
On-FPA Electronics Delivery	×	
Fauticate FED 120x120 UPT A processing electronics	: ;	
Passive-to-active sensor handover demo at	×	
Deliver Ladar Sensor Subsystem		×
Deliver Passive/Active Sensor Subsystem Deliver Fusion Processing Subsystem		< ×
Deliver Radar Sensor Subsystem		×
Project 1161 Pag	Page 13 of 38 Pages	Exhibit R-2 (PE 0603173C)

RDT&E BUDGET ITEM		TIFICA	TION S	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NI 0 0 0	PE NUMBER AND TITLE 0603173C Supp	ппе Support T	E NUMBER AND TITLE 0603173C Support Technologies - ATD	gies - AT	Q	<u> </u>	РРОЈЕСТ 1270
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1270 Adv Interceptor Materials and Systems Tech	26,788	68,409	31,492	29,412	42,890	46,133	49,460		42,449 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

space surveillance and defense systems. The objectives of these investments are component and systems technologies with improved performance and reduced costs capabilities at affordable cost with lower technical and schedule risks for boost phase and terminal missile defense interceptors, advanced target sensors and future To prepare for critical future defense needs, advanced technology programs will invest in a balanced program of high leverage technologies that yield improved for acquisition programs, and technical solution options to mitigate advanced and unpredicted threats.

The Advanced Interceptor Materials and Systems Technology (AIMST) program develops and demonstrates the following for interceptor and space surveillance systems: advanced interceptor sensor processing and power components; multifunctional material and structures; low cost interceptor composite manufacturing processes; and low cost flight test demonstrations. These technologies are critical to the deployment of effective, affordable TMD and NMD systems

fielding current NMD Technology Readiness and TMD systems hardware. The execution of this comprehensive technology program, however, is slowed by funding The near-term AIMST projects are planned and executed through direct interchange with System Program Offices (SPOs) and prime contractors responsible for limitations. This impedes efforts on near-term technologies that will increase interceptor and sensor performance while lowering deployment costs.

The AIMST program consists of six major task programs: Discriminator Interceptor Technology, Materials and Structures, Power Technology, Endo Atmospheric Flight Experiment (EFEX), the Space Technology Research Vehicle (STRV), and the Atmospheric Interceptor Technology (AIT) programs

data fusion processor and associated discrimination/data fusion algorithms, to demonstrate the performance and readiness of the advanced subsystems to support future waveform generation to support on-board imaging. The primary goal of the DITP program is interceptor flight demonstrations of the integrated sensor suite, with its sensors, and laser radars (ladars) are being designed, fabricated, and tested. Emphasis is placed on increasing active sensor output power, miniaturization, and ladar Discriminator Interceptor Technology Program: The Discriminator Interceptor Technology Program (DITP) develops subsystems necessary to achieve long range threat acquisition and tracking, accurate homing guidance, robust discrimination, and aimpoint selection for autonomous hit-to-kill interceptors. Passive infrared form-fit-function upgrades to NMD and TMD interceptors.

temperature superconductor LWIR sensor electronics. This program also evaluates new high temperature, composite materials for use in manufacturing propulsion components such as ceramic hot gas lines, combustion chambers, nozzles, and exit cones. Many projects executed under the Materials and Structures Task, which composite structural components; adaptive and passive vibration isolation and suppression systems; optical materials and baffle specialty components; and low The Materials and Structures Program: The materials and structures program develops and demonstrates: advanced, low cost to manufacture, multifunctional,

Project 1270

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Exhibit R-2 (PE 0603173C

RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997	1997
BUDGET ACTIVITY	PE NUMBER AND TITLE		PROJECT
3 - Advanced Technology Development	0603173C Support Technologies - ATD	۵	1270

includes the EFEX and STRV programs, rely on cofunding from other agencies (AF, USA, DARPA, NASA) or international partners (UK, Japan). In some cases this cooperative funding represents a substantial portion of the total project cost. Reductions in current or future cooperative funding will adversely impact planned goals and schedules.

Power Technology Program: The power program develops concentrator solar arrays (SCARLET); electric generators, thermal management components, and power conditioning for GBR; and batteries for TMD and NMD interceptors. The technologies will improve system performance in terms of reducing recurring costs, lowering mass and increasing efficiency. Endo Atmospheric Flight Experiment (EFEX) Program: This multiflight test program will use existing sounding rockets to provide the hypersonic flight environment propulsion systems, and dual mode seekers and aperture will be tested. The flight test results will be correlated with aerothermal-mechanical test results from groundto validate advanced interceptor technologies. Lightweight, ultrastiff, high temperature, multifunctional structures, optical and structural thermal control concepts, based hypersonic and shock tube facilities in the 3 to 4 km/sec velocity and 20 km to 45 km altitude range. Subsequent tests will emphasize high-G maneuverable super-tough optical windows and erosion resistant coatings, emergent processing and guidance schemes, miniature inertial systems, advanced shroud concepts, flight profiles.

and systems will be obtained. A one year mission is planned. Efforts have been initiated to conduct follow-on cooperative space experiments with the UK using micro supporting the following 6 primary payloads: 1) a UK provided Mid-Wavelength Infrared (MWIR) experiment; 2) the Vibration Isolation Suppression System (VISS); 3) the Space Active Modular Materials Experiment System (SAMMES); 4) the Electronic Test Bed (ETB); 5) the Laser Communications Experiment (Lasercom); and specified by the Space and Missile Tracking System (SMTS) SPO. Data on the space environment at SMTS mission altitudes and its effects on materials, components Space Technology Research Vehicle Program (STRV-1c/d, STRV-2 and STRV-3): The STRV-2 Experiment Module will consist of an advanced composite structure Technology Research Vehicle-3 (STRV-3) will be a US-led multi-agency, multi-national (UK, US allies) cooperative space experiment effort. The program is in the including the composites used in structures. The primary payloads form an overall integrated payload. MWIR background/clutter data will be obtained using filters satellites based on the recent US/UK STRV 1a/b program. These UK-provided micro satellites (STRV 1c/d) have a nominal launch planned for Fiscal Year 1999. providing critical validation for incorporation of this technology in future systems. Multiple sensors will be used to measure local contamination from all sources, 6) the micro-meteoroid & debris (MM&D) experiment. The low outgassing, high stiffness and high strength composite structure is part of the overall experiment The experiments to be flown on STRV 1c/d include a Quantum Well Infrared Photometer (QWIP) sensor and a multi-functional composite structure. The Space preliminary discussion stage Atmospheric Interceptor Technology (AIT) Program: The AIT program will develop, integrate and demonstrate the critical technologies for performing hypersonic hitwith reduced costs/risks compared to current interceptor weapons systems, and enhancements to other interceptors under development; (2) reduction of technical risks to-kill intercepts of TBMs within the atmosphere. The demonstrations will validate the solution to critical KKV technologies and will provide: (1) new capabilities contingencies not currently addressed by the TMD system programs. The program uses existing contracts and technologies currently under development to reduce and costs in support of acquisition programs through direct technology insertions; and (3) technical solutions to provide theater defense interceptor capabilities for

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Exhibit R-2 (PE 0603173C)

	RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	2 Exhibit) DATE February 1997
BUDGET ACTIVITY 3 - Advance	TIVITY Inced Tec	8UDGET ACTIVITY 3 - Advanced Technology Development O603173C Supp	PROJECT O603173C Support Technologies - ATD 1270
schedu The AI	ile and cost, a (T project wil	schedule and cost, and will be planned and conducted with BMDO, Air Force, Navy, and Army elements to make maximum use of existing Service infrastructures. The AIT project will participate in the UAV/BPI Studies (PMA 1294) and the Navy Theater Wide requirements studies.	ements to make maximum use of existing Service infrastructures. requirements studies.
EY 199	EY 1996 (\$ in Thousands): - \$5,409 Space cryoc (ACT)	Surveillance System Supp coolers, MWIR filters, and I. (EX-1) spaceflight experime	periments (STRV-1b) data reduction and final reports. Delivered eriment. Launched Advanced Control technology Experiment-1 evelopment of STRV-1c/d space flight experiments. Initiated
. \$1	\$15,571	development of multi-functional structures for spacecraft. Initiated development of an advanced, fight efficiency concentrator solar array. Interceptor System Support: Demonstrated low frame rate image processing with Ground Based Interceptor (GBI) Long Wave Infra Red (LWIR) Focal Plane Array (FPA) and Low Temperature Superconductor (LTS) Analog to Digital Converter and Multiplexer (ADC/MUX) operating at 10K. Developed test articles of advanced optical baffles and weight reducing advanced composite components for TMD systems. Initiated design of EFEX-1 flight hardware to evaluate aerothermal heating of windows and high temperature interceptor composite structures. Demonstrated 3 meter folded CO2 ladar at AMOR and WSMR. Initiated fabrication of 6-m CO2 Multi-Folded Ladar (MFL). Fabricated	structures for spacecraft. Initiated development of an advanced, fighther effection concentrator solar array. The monstrated low frame rate image processing with Ground Based Interceptor (GBI) Long Wave Infra Red and Low Temperature Superconductor (LTS) Analog to Digital Converter and Multiplexer (ADC/MUX) that articles of advanced optical baffles and weight reducing advanced composite components for TMD systems. I hardware to evaluate aerothermal heating of windows and high temperature interceptor composite structures. I landware to available to the structure of the control of the co
- \$\$	\$5,808	FPA. Collected active and passive sensor data at AMOR. Demonstrated real-time fusion algorithms. Initiated composite component manufacturing programs with Japan. Demonstrated high frame rate low temperature superconducting LWIR sensor signal processing ADC. Completed subscale high temperature propulsion. Atmospheric Interceptor Technology: Continued prototype strapdown seeker validations and tests. Completed downselect to single prime contractor. Conducted cooled window and forebody aero-optical shock tunnel tests. Conducted forebody and airframe vibration tests and field	al-time fusion algorithms. Initiated composite component aperature superconducting LWIR sensor signal processing ADC. er validations and tests. Completed downselect to single prime nel tests. Conducted forebody and airframe vibration tests and field
- \$2	\$26,788	joint validation, and initiated development of solid propellant Divert and Attitude Control System (DACS) components. Continued detailed design of KKV vehicle. Total	titude Control System (DACS) components. Continued detailed
EV 199	FY 1997 (\$ in Thousands): - \$5,239 Spacinteg	usands): Space Surveillance System Support: Complete data reduction of ACTEX-1 space flight experiment. Deliver SAMMES for STRV-2. Complete integration of STRV-2 flight experiments. Continue STRV-1c/d Program. Deliver flight qualified, multi-kilowatt advanced concentrator for	space flight experiment. Deliver SAMMES for STRV-2. Complete Deliver flight qualified, multi-kilowatt advanced concentrator for
	\$20,138	FY98 flight demonstration. Interceptor System Support: Continue development of weight-reducing structural, thermal and optical components for advanced TMD systems. Interceptor System Support: Continue development of weight-reducing structural, thermal and optical components for advanced TMD systems. Continue development of EFEX-1 flight hardware. Perform lab test of 6-m CO2 MFL transmitter. Perform lab test of integrated 2-D solid state ladar and receiver breadboards. Continue joint composites program with Japan. Perform simultaneous 2-color HgCdTe arrays. Initiate design of DITP data fusion processor. Award DITP System Integration Contract. Fabricate two ceramic hot gas lines. Begin thust chamber firings. Continue smart nach technology.	ntinue development of weight-reducing structural, thermal and optical components for advanced TMD systems. I flight hardware. Perform lab test of 6-m CO2 MFL transmitter. Perform lab test of integrated 2-D solid state Continue joint composites program with Japan. Perform simultaneous 2-color HgCdTe imagery demonstration. 56x256 simultaneous 2-color HgCdTe arrays. Initiate design of DITP data fusion processor. Award DITP brieste two ceramic hot gas lines. Begin thrust chamber firings. Continue smart nach technology.
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R	RDT&E BUDGET ITEM JUSTIFICATIO	JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 3 - Advanced Tec	BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	PROJECT 1270
- \$43,032 - \$68,409	E E S B E	ology: Complete prototype seeker development and conduct initial hardware-in-the-loop (HWIL) tests. so-optic shock tunnel tests. Conduct cold-gas jet interaction wind tunnel tests. Complete preliminary d ground test unit (GTU). Complete integrated avionics unit final design. Fabricate and integrate vehicle ry software specifications. Conduct System Requirements Review. Conduct Preliminary Design Review limeter Wave (RF) technology development (lightweight Ka-band seeker transmitter).	in-the-loop (HWIL) tests. Conduct s. Complete preliminary design of icate and integrate vehicle Preliminary Design Review for smitter).
EY 1998 (\$ in Thousands): - \$3,238 Space solar - \$23,364 Interemental MFL	Space Surveillance System Support: Launch STRV-2 flight experiment and initiate data analysis. Launch and operate advanced concentrator solar array demonstration. Deliver STRV 1c/d flight experiments. Interceptor System Support: Conduct EFEX 1 flight experiments and initiate development of EFEX-2 flight experiments. Demonstrate 6-m MFL CO2 ladar transmitter integrated with receiver and controls. Fabricate 3-D solid state imaging ladar transmitter. Complete Si-APD ladar receiver. Complete thrust chamber firings. Perform imagery demo of 256x256 simultaneous 2-color HgCdTe FPAs. Host real time DITP	Elight experiment and initiate data analysis. Launch ar speriments. represent of EFEX-2 flight denitrols. Fabricate 3-D solid state imaging ladar tranagery demo of 256x256 simultaneous 2-color HgCdT	nd operate advanced concentrator experiments. Demonstrate 6-m nsmitter. Complete Si-APD ladar e FPAs. Host real time DITP
- \$4,890 - \$31,492	algorithms on WSSP (ASTP) processor in lab demo. Complete ceramic hot gas line testing. Evaluate LTS time dependent processing with Japanese provided RAM, and initiate prototype cryogenic GBR development. Atmospheric Interceptor Technology: Continue seeker HWIL tests. Continue vehicle component development and tests. Total	omplete ceramic hot gas line testing. Evaluate LTS to nic GBR development. HWIL tests. Continue vehicle component development.	ime dependent processing with int and tests.
FY 1999 (\$ in Thousands): - \$2,964 Space devel - \$21,458 Interc demo	Space Surveillance System Support: Complete STRV-2 flight experiments. Launch STRV 1c/d. Prepare final reports for STRV-2. Initiate development of multifunctional spacecraft structure flight experiment. Interceptor System Support: Continue development of EFEX-2 flight experiments. Test prototype multifunctional structure. Integrate and lab demonstrate 3-D solid state transmitter and receiver. Perform testing at AMOR to support downselect. Design and fabricate simultaneous 3-color HgCdTe arrays. Demonstrate real time discrimination and data fusion algorithms on WSSP. Continue BMDO/Japanese RTM development for complex-shaned composite structures. I.TS sensor development, and continue development of prototype cryopenic GBR	2 flight experiments. Launch STRV 1c/d. Prepare fir sht experiment. EFEX-2 flight experiments. Test prototype multifun erform testing at AMOR to support downselect. Designation and data fusion algorithms on WSSP. Continue I.TS sensor development, and continue development.	al reports for STRV-2. Initiate ctional structure. Integrate and labin and fabricate simultaneous 3-BMDO/Japanese RTM of prototyne cryopenic GBR
- \$4,990 - \$29,412	system. Atmospheric Interceptor Technology: Continue vehicle component development and tests. Total	e component development and tests.	
Acquisition Strateg relevant in-house e manufacturing/provand joint agency cc US/Japan Composi	Acquisition Strategy: The AIMST Project uses U.S. Army Space and Strategic Defense Command, DoD and DOE laboratories to fund contractors supported by relevant in-house expertise to meet the AIMST milestones. Weapons systems prime contractors acquire license agreements to use advanced manufacturing/producibility processes (e.g., composite materials, baffles and nozzles) developed by the AIMST Project. International funding (e.g., UK and Japan) and joint agency coalitions (e.g., NASA, DoE and ARPA) are assembled to obtain critical level of effort (e.g., US/UK STRV-2, BMDO/AF/ARPA Smart Structures, US/Japan Composites and superconducting materials programs). The AIT program plan will consist of development and validation of endoatmospheric kill vehicle	Army Space and Strategic Defense Command, DoD and DOE laboratories to fund contractors supported by tones. Weapons systems prime contractors acquire license agreements to use advanced te materials, baffles and nozzles) developed by the AIMST Project. International funding (e.g., UK and Japan) the As are assembled to obtain critical level of effort (e.g., US/UK STRV-2, BMDO/AF/ARPA Smart Structures, programs). The AIT program plan will consist of development and validation of endoatmospheric kill vehicle	fund contractors supported by advanced mal funding (e.g., UK and Japan) ADO/AF/ARPA Smart Structures, 1 of endoatmospheric kill vehicle
Project 1270	Pag	Page 17 of 38 Pages Exh	Exhibit R-2 (PE 0603173C)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	JUSTIFICAT	ION SH	IEET (R	-2 Exhib	oit)		DATE Febi	February 1997	7
BUDGET ACTIVITY 3 - Advanced Technology Development		DE NO.	PE NUMBER AND TITLE 0603173C SUP	пге upport Te	DE03173C Support Technologies - ATD	jies - ATI	0	PR 12	PROJECT 1270
technologies for potential use in advanced TMD systems, such as advanced NTWD, THAAD, MEADS and UAV/BPI; options for the design, fabrication, and test of the KKVs; options for KKV/hooster integration and flight tests. USASSDC will provide technical and contract management of the AIT prime contract. On-going, competitively-awarded, CPFF contracts for the kill vehicle technologies within the AIT program will continue through the completion of ground testing and potential flight tests. The DITP program uses: USASSDC in-house expertise and contractors for ladar technology development; AF Philips Lab personnel and contractors to develop infrared detector technology; and BMDO personnel and contractors to lead integration activities, flight demonstrations and fusion processor development.	fins, such as advandelight tests. USASS ehicle technologies house expertise and ersonnel and contra	ced NTWD, DC will provide the A contractors ctors to lead	THAAD, MI vide technica IT program for ladar tecl integration a	EADS and U il and contra will continue hnology dev	IAV/BPI; of ct managem e through the elopment; #	ent of the Alections for the Alection completion AF Philips Lations and fi	e design, fabr IT prime cont 1 of ground te ab personnel a	ication, and tract. On-go sting and po and contract or developm	test of ing, tential ors to ent.
B. Program Change Summary (\$ in Thousands)									
Previous President's Budget Appropriated Value	EY 1996 22,899	įτ	EY 1997 30,109 70,109	FY 1998 28,519	FY 1999 27,888		Total Cost 109,415		
Adjustments to Appropriated Value: a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) c. Internal BMDO Adjustments Current Budget Submit'President's Budget	26,788		-3,290 -258 1,848 68,409	31,492	29,412		156,101		
Change Summary Explanation: Funding: Changes in funding resulted in realigning of interceptor & sensor technologies within Projects 1270 and 1161 to better reflect the technologies' principal application. The AIT Program was transferred to Project 1270 in FY96 from Project 1265 (BPI), PE 0603870, without funding. Execution of the STRV-2 Program was consolidated under Project 1270 starting in FY97. AIT program funding in FY97 increased in accordance with FY97 Authorization and Appropriations Act. Scholar Delay in program milestones for DITP and Materials and Structures program due to transfer of AIT Technology development to Project 1270 and other funding reductions. AIT program milestones accelerated due to increased FY97 funding Technical: None	ng of interceptor & sensor technologies within Projects 1270 and 1161 to better reflect the technologies' principa of Project 1270 in FY96 from Project 1265 (BPI), PE 0603870, without funding. Execution of the STRV-2 Program? Y97. AIT program funding in FY97 increased in accordance with FY97 Authorization and Appropriations Act. and Materials and Structures program due to transfer of AIT Technology development to Project 1270 and other relerated due to increased FY97 funding	sensor techn '96 from Pro 1 funding in 1 Structures pr eased FY97	ologies withi ject 1265 (B FY97 increas ogram due te funding	in Projects 1. PI), PE 0603 sed in accord o transfer of	270 and 116 3870, withou lance with F AIT Techno	1 to better re tt funding. 1 Y97 Author dogy develo	effect the tech Execution of t ization and A pment to Proj	mologies' pr the STRV-2 ppropriation ject 1270 an	incipal Program s Act.
C. Other Program Funding Summary (\$ in Thousands)	্ (জ								
E3 2400 NMD Program, PE 0603871C 7. 1161 Advanced Sensor Technology, PE 0603173C 1161 Advanced Sensor Technology, PE 0603872C	FY 1996 FY 1997 730,656 828,864 19,326 32,797 1,270 3,334	EY 1998 504,091 24,527 3,364	FY 1999 393,085 22,743 3,208	FY 2000 309,748 19,723 3,199	EY 2001 309,9584 18,921 3,151	EY 2002 391,858 16,995 3,148	FY 2003 392,433 25,566 3,153	To Compl Cont Cont	Total Cost Cont Cont
Project 1270		Page 18 of 38 Pages	38 Pages			Exhibi	Exhibit R-2 (PE 0603173C)	03173C)	





RDT&E BUDGET ITEM		FICAT	NO NO	JUSTIFICATION SHEET (R-2 Exhibit)	R-2 E	chibi			DATE		February 1997	266
BUDGET ACTIVITY 3 - Advanced Technology Development	opment		E 0	PE NUMBER AND TITLE 0603173C Supp	Support Technologies	rt Tec	hnolog		ATD			РКОЈЕСТ 1270
D. Schedule Profile												
	FY 1996	-		Y 199	•	•	FY 1998	88 '	•	-	Y 199	•
AIT A and Oution shoot tunned tests	1 2 ×	4	_	۶ 7	4	-	7	3	4	_	5 3	4
A11 Aero-Optical snock turner tests (window #1)	<											
AIT Downselect to single prime contractor	× >											
Initiate design of Advanced SCARLE! 3-m CO2 ladar transmitter demo	× <											
Initiate Joint Composites Manufacturing	×											
Program with Japan												
Test THAAD DACs Bulkhead	×											
SCARLET design complete	×											
Solid state ladar amplifier demo	×											
3-m CO2 ladar receiver demo	×	!										
Demo superconductor ADC/MUX with		×										
GBI FPA			1									
6-m CO2 ladar amplifier test			×									
Solid state ladar 2-D imaging demo			×									
Deliver SAMMES and Sensor Isolation				×								
System to STRV-2												
AIT Systems Requirement Review				×								
AIT aero-optical shock tunnel tests				×								
(window #2)												
AIT prototype seeker development and				×								
test												
AIT jet interaction wind tunnel test				×								
Perform simultaneous 2-color HgCdTe				×								
imagery demonstration												
Complete Data Reduction of ACTEX-1				×								
AIT seeker initial HWIL tests					×							
AIT PDR for flight test vehicles					×							
Award DITP system integration contract					×							
Interceptor composite structures demo					×							
Project 1270		F	age 19	Page 19 of 38 Pages				Ť	hibit R-	2 (PE 0	Exhibit R-2 (PE 0603173C)	

RDT&E BUDGET ITEM JUSTIFICAT	JSTIFICATION SHEET (R-2 Exhibit)	ibit)	DATE February 1997	1997
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support	Support Technologies - ATD	- ATD	PROJECT 1270
9661 X3	FY 1997	FY 1998	FY 1999	6
1 2 3 4	1 2 3 4 1	1 2 3	4 1 2	3 4
Deliver Advanced SCARLET Array to	^	×		
Spacecraft Integrator				
Initiate KV ground plane EMI shield	^	×		
demo				
Initiate prototype cryo-GBR design	71	×		
Host real-time DITP algorithms on		×		
ASTP's WSSP processor and perform lab				
demo		,		
Launch DIRV-2		< >		
AMOR		<		
Trinch and evaluate QCARIET erray			>	
Laulici allo evaluate de la			< >	
Demo 6-m MFL CO2 ladar transmitter			< ≻	
integrated with receiver and controls at			4	
AMOR				
Demonstrate full-up, real-time			×	
discrimination and data-fusion algorithms				
on WSSP (field test)				
Complete Cryo-GBR system design			×	
Integrate and perform lab demo of 3-D			×	
solid-state transmitter and receiver				
LTS sensor processor demo			×	
Complete STRV-2 Data Analysis			×	
Test prototype interceptor multifunctional				×
structure				
Perform AMOR testing (image				×
discrimination) to support ladar				
downselect				
				i
Project 1270	rage 10 of 38 Pages		Exhibit R-2 (PE 0603173C	(C)



RDT&E BUDGET ITEM		TIFICA	FION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NI 060	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	IITLE Support T	echnolog	gies - AT	0	<u>.</u>	экојест 1360
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1360 Directed Energy Program	76,488	95,930	28,877	28,539	28,222	27,631	28,224	28,886	Continuing	28,886 Continuing Continuing

A. Mission Description and Budget Item Justification

theaters, regardless of size, geometry, or weather conditions. This system also provides many ancillary capabilities, including air defense, global surveillance and target concepts, this program element, project number 1360, contains DOD's only boost phase intercept program that can provide national missile defense and operate in all continuous, global boost phase intercept option for both theater and national missile defense. While BMDO is pursuing numerous terminal and midcourse intercept BMDO's charter is to provide for defense against current and future missile threats. An effective missile defense against a wide variety of current and near-term projected threats will require boost phase intercept capability. The Space Based Laser (SBL) program was created to provide the nation with a highly effective, detection and designation for other systems.

coverage of missile threats from theaters anywhere. Each SBL would be capable of destroying approximately 100 missiles with the initial fuel load. Capability for on-Unique features of an SBL missile defense system include global, 24 hour boost phase intercept capability and defense against surprise first strikes. SBLs can destroy knowledge of enemy launch site locations. The footprint of one SBL can cover approximately 10% of the earth. Twenty SBLs could provide overlapping full-time orbit refueling would be provided. An SBL system could defend against missiles without putting the lives of US military personnel at risk. With its long range and speed of light defense, it accomplishes boost phase intercept at the earliest possible moment, offering the highest probability that intercepted missile fragments missiles whose range is greater than 75 miles, providing a robust first layer for both theater and national missile defenses-in-depth. SBLs do not require prior (possibly containing active chemical/biological or nuclear materials) will fall within the attackers territory, not on defended assets.

components of a Space Based Laser be integrated on the ground and operated as a system? (Alpha LAMP Integration (ALI)); (5) Can missile targets be acquired and militarily useful ranges? (Alpha program); (2) Can mirrors and optics be built large enough and easily enough? (Large Aperture Mirror Program (LAMP) and Large The directed energy program is structured to address the key critical technical issues: (1) Can a chemical laser be built powerful enough to destroy a missile at components be integrated into a functional unit suitable for space flight and remote operation? (Space Based Laser Readiness Demonstrator (SBLRD) Ground Optical Segment (LOS)); (3) Can the high power beam be controlled adequately? (Large Optics Demonstration Experiment, LODE); (4) Can the high power tracked from space and can a laser be pointed and fired accurately enough? (Acquisition, Tracking, Pointing, and Fire Control, ATP/FC); (6) Can these key Demonstration); (7) Can the fully integrated system operate adequately on-orbit? (SBLRD).

Large Optics Demonstration Experiment (LODE) demonstrated the ability to control the projected (or outgoing) beam in low power laser experiments in 1987. (5) The functions. (1) The Alpha program's high energy chemical laser achieved weapons-class power for the first time in 1991. (2) LAMP and LOS demonstrated the ability Progress To Date. The program has demonstrated that the answer to questions 1 through 3 (and partially 5) is "yes," and has built devices that perform the respective to build optics of the required size with the successful fabrication of a 4-meter segmented mirror in 1989 and a key segment of an 11 meter mirror in 1993. (3) The

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RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced Technology Development	0603173C Support Technologies - ATD	

The ATP/FC technologies required (sensors, optics, processors, etc.) have been demonstrated at or near performance levels required for the Space Based Laser. Stable low power laser beam pointing from a space platform was demonstrated at the same precision level required for an operational SBL in 1991 during the flight of the pasic technology of acquiring and tracking missiles and pointing a high power laser beam from ground and space has been demonstrated by a number of programs. Relay Mirror Experiment (RME) Current Status. The major building blocks have been developed, but key system integrations and tests lie ahead. Remaining tasks are: to integrate the high power laser with the large optics beam director and test (Alpha-LAMP Integration (ALI)); to integrate and test ATP/FC hardware and software (High Altitude Balloon Experiment (HABE)); to integrate the high power laser and the large optics beam director hardware with ATP/FC hardware and test; to integrate the system in a space qualified SBL Readiness Demonstrator (SBLRD) vehicle for tround and flight testing.

(CONOPs) and design requirements for an operational SBL system, and revitalize the SBL technology development efforts. The increased funding allowed us to In FY96, Congress provided additional program funding to continue ALI, accelerate design activities for a space demonstration, produce a concept of operations preserve vital infrastructure, restore the ALI program to its original scope, and continue the ATP/FC program.

PROGRAM ACCOMPLISHMENTS AND PLANS:

The current plan brings Alpha back to test readiness and, with Congressional added funding, completes ALI high power testing in FY97. The Alpha device and facility have been reactivated and the test team reconstituted. In Sep 96, a high power reactivation test of the Alpha laser device was successfully completed after a down time of over two years. In ALI, all major assemblies were fabricated, integrated, and tested in the test chamber. In Dec 96, an Alpha hot flow test was conducted while performing a low power integration check-out of the ALI beam train.

Requirements Document (CARD) was updated with emphasing in the CONOPS, design requirements, satellite design, and launch vehicle design. Design reviews for site selection, and preliminary environmental assessment for the Space Test Facility (STF) will be completed in FY97. Design activity for the SBLRD is continuing the demonstrator space vehicle and operational SBL system concepts occurred in Dec 96. The SBLRD test site selection process was restarted. The facility design, In compliance with Congressional language, design activities for the follow-on space qualified vehicle ground demonstration were restarted, and the Cost Analysis

Experiment (HABE) platform was completed and testing begun. With the FY97 Congressional added funding, integrated ground testing will be completed in early The ATP/FC program completed fabrication and test of the illuminator laser that will be used in the field experiments. Integration into the High Altitude Balloon FY98, and the first flight test will occur in FY99. Work resumed on high payoff advanced technologies. The unique facility (Large Optics Diamond Turning Machine) and capability to build the Alpha resonator optics followed by a high power test of the new uncooled resonator in FY01 (assuming POM funding). Procurement of an uncooled deformable mirror (DM) was initiated has been restored, and preliminary fabrication of the new, advanced, lightweight, uncooled resonator optics has begun. Fabrication continues through FY01 and is The mirror will be integrated into the high power beam train and tested in FY99.

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RD	RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit) DATE Fe	February 1997
BUDGET ACTIVITY 3 - Advanced Tec	BUDGET ACTIVITY 3 - Advanced Technology Development 0	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	РРОЈЕСТ 1360
EV 1996 (\$ in Thousands): - \$35,993 ALI 1	ntegration and Test: Comure, and remaining cabling	unds): ALI Integration and Test: Completed system integration of major assemblies including the secondary mirror, wavefront sensor, metering structure, and remaining cabling and plumbing. Reestablished metrology lab to preserve industry capability to test coatings of uncooled optics.	sor, metering of uncooled optics.
- \$9,683	Fabricated and tested diagnostic wavefront sensor for high I Alpha Restart: Maintained Alpha laser with periodic operat flowing all water systems, operating the pressure recovery s inspecting optics and probe laser, and performing alignment	Fabricated and tested diagnostic wavefront sensor for high power tests. Conducted low power experiments (ALLI test plan series 100). Alpha Restart: Maintained Alpha laser with periodic operations of critical systems through first three quarters. Periodic operations included flowing all water systems, operating the pressure recovery system and isolation gate valves, operating all pumps, compressors and valves, inspecting optics and probe laser, and performing alignment checks. Made repairs as required, reconstituted test team and prepared facility for	ries 100). crations included its and valves, repared facility for
- \$4,390	high power operation. Validated diagnostics performance in preparation for 1QFY97 revalidation high power tests. Dem/Val Design: Updated designs of space qualified demonstration vehicle taking into account latest accomplishm directed energy technologies. Restarted planning for space test facility. Reactivated site selection process and upda facility requirements document. Identified and began work on long-lead issues.	high power operation. Validated diagnostics performance in preparation for 1QFY97 revalidation high power tests. Dem/Val Design: Updated designs of space qualified demonstration vehicle taking into account latest accomplishments in spacecraft and directed energy technologies. Restarted planning for space test facility. Reactivated site selection process and updated integration and test facility requirements document. Identified and began work on long-lead issues.	spacecraft and gration and test
- \$8,786 - \$4,967	EMD Design: Updated requirements and design based on current projected threat and latest acco technologies. Provided traceability criteria to Dem/Val design task. Refined and updated CARD Acquisition, Tracking, and Pointing: Completed fabrication and acceptance testing of illuminators of the part of the p	EMD Design: Updated requirements and design based on current projected threat and latest accomplishments in spacecraft and directed energy technologies. Provided traceability criteria to Dem/Val design task. Refined and updated CARD. Acquisition, Tracking, and Pointing: Completed fabrication and acceptance testing of illuminator laser. Completed hardware integration and acceptance testing of illuminator laser.	and directed energy re integration and
- \$12,669	SBL Support Technologies: Reactivated Large Optics Dian Low Temperature (HYLTE) nozzle module at fundamental be used in the phase conjugation experiment. Conducted na success beased or Completed design requirements for 4-m	SBL Support Technologies: Reactivated Large Optics Diamond Turning Machine (LODTM). Began test of the first advanced Hypervelocity Low Temperature (HYLTE) nozzle module at fundamental Hydrogen Fluoride wavelength. Began fabrication of the NACL beam train optics to be used in the phase conjugation experiment. Conducted narrow field of view testing of auto-alignment algorithms on advanced beam control	ced Hypervelocity L beam train optics to nced beam control
- \$76,488	iii Otassooatu. Comprose		
EY 1997 (\$ in Thousands): - \$29,031 ALIV. and 3	Alpha High Power Testing: 00) experiments on ALI at 1	Complete high power revalidation test of Alpha laser. Complete assembly and system integration (Level 200 low power. Complete open loop and closed loop high power tests to demonstrate and characterize integrated	gration (Level 200 acterize integrated
- \$46,497	Space Based Laser Readiness Demonstrator (SBLRD): Cor facility. Complete facility site selection and environmental mirror and uncooled resonator for SBLRD. Continue SBLF and recertification of the Large Optics Diamond Turning M	Space Based Laser Readiness Demonstrator (SBLRD): Complete design updates for the SBL Readiness Demonstrator vehicle and the space test facility. Complete facility site selection and environmental assessment, and initiate construction. Initiate long-lead procurements of primary mirror and uncooled resonator for SBLRD. Continue SBLRD design effort toward a Preliminary Design Review (PDR). Complete reactivation and recertification of the Large Optics Diamond Turning Machine (LODTM) at Lawrence Livermore National Laboratory (LLNL). Maintain	cle and the space test ments of primary omplete reactivation LLNL). Maintain
- \$5,244	the LODTM in operating condition. Complete the test of th SBL System: Complete design and requirement updates for Requirements Document.	tion. Complete the test of the first advanced nozzle module and the initial auto-alignment tests. and requirement updates for the operational SBL spacecraft. Complete update of the Cost Analysis	sts. Analysis
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	RDT&E BUDGET ITEM JUSTIFICA	USTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 3 - Advanced	3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	- ATD 1360
- \$4,323	Scorpius: Complete design, fabrication and ground test of launc Launch Vehicle Technology Testbed (LVTT). Continue fabricat begin to fabricate 20,000 lb thrust engines for tests in late FY97.	Scorpius: Complete design, fabrication and ground test of launch vehicle propulsion and non-propulsion components to flight test a sub-orbital Launch Vehicle Technology Testbed (LVTT). Continue fabrication and development of additional vehicles for flight tests in FY98. Design and begin to fabricate 20,000 lb thrust engines for tests in late FY97.	components to flight test a sub-orbital es for flight tests in FY98. Design and
- \$1,942 - \$8,893	Advanced Technologies: Complete the fabricati High Altitude Balloon field Experiment (HABE) Sands Missile Range (WSMR), NM, for ground checkout flight in EV08 and flight test in EV09	Advanced Technologies: Complete the fabrication of optics for the phase conjugation experiment. High Altitude Balloon field Experiment (HABE): Complete passive and active tracking tests against boosting scaled rockets. Deploy to White Sands Missile Range (WSMR), NM, for ground test against boosting missiles (targets of opportunity). Restart balloon segment to prepare for checkout flight in EVOS and flight test in EVOS.	sting scaled rockets. Deploy to White estart balloon segment to prepare for
- \$95,930	Total		
FY 1998 (\$ in Thousands): - \$1,942 ALI 7 - \$21,285 Space powe (LLN	Thousands): ALI Test Final Report: Complete test data reduce Space Based Laser Readiness Demonstrator (SB power beam train. Maintain operation of the Late (LLNL) for production of uncooled laser resonations.	ALI Test Final Report: Complete test data reduction and archiving. Complete final test report. Space Based Laser Readiness Demonstrator (SBLRD): Complete and demonstrate operation of new light-weight uncooled deformable in high power beam train. Maintain operation of the Large Optics Diamond Turning Machine (LODTM) at Lawrence Livermore National Laboratory to production of uncooled laser resonator. Acquire silicon and begin fabrication of uncooled resonator optics. Prepare coating	t-weight uncooled deformable in high rence Livermore National Laboratory sonator optics. Prepare coating
- \$152 - \$5,498 - \$28,877	chamber of coating of annuar optics. SBL System: Continue SSDC modeling and analysis support using EADSIM at modest level High Altitude Balloon field Experiment (HABE): Complete WSMR ground test against boos checkout flight of balloon segment to prepare for flight test of ATP payload in FY99. Total	chamber of coating of annuar optics. SBL System: Continue SSDC modeling and analysis support using EADSIM at modest level. High Altitude Balloon field Experiment (HABE): Complete WSMR ground test against boosting missiles (targets of opportunity). Perform checkout flight of balloon segment to prepare for flight test of ATP payload in FY99. Total	s (targets of opportunity). Perform
FY 1999 (\$ in Thousands): - \$22,889 Space LLNI - \$152 SBL (\$ - \$5,498 High boost - \$28,539 Total	Space Based Laser Readiness Demonstrator (SBLRD): Continue fabrication and test of uncoc Space Based Laser Readiness Demonstrator (SBLRD): Continue fabrication and test of uncoc LLNL. Begin coating of first resonator optic. Begin preparation of test facility for test of un SBL System: Continue SSDC modeling and analysis support using EADSIM at modest level. High Altitude Balloon field Experiment (HABE): Complete two flights of the ATP payload a boosting missiles. Scale results to SBLRD and operational SBL performance levels. Prepare Total	Space Based Laser Readiness Demonstrator (SBLRD): Continue fabrication and test of uncooled resonator optics using the LODTM machine at LLNL. Begin coating of first resonator optic. Begin preparation of test facility for test of uncooled resonator in FY00-01 SBL System: Continue SSDC modeling and analysis support using EADSIM at modest level. High Altitude Balloon field Experiment (HABE): Complete two flights of the ATP payload and actively track in "near-space" environment boosting missiles. Scale results to SBLRD and operational SBL performance levels. Prepare for final flight test in FY00.	or optics using the LODTM machine at nator in FY00-01 track in "near-space" environment ght test in FY00.
Acquisition Si efforts are per launch the SB	trategy: BMDO's contract to build an SBL ("Zenith Starformed under this contract. The Alpha laser is maintain LRD with appropriate waivers. In FY97, an acquisition	Acquisition Strategy: BMDO's contract to build an SBL ("Zenith Star") was competed in 1988 and awarded to (then) Martin Marietta. The ALI and SBLRD design efforts are performed under this contract. The Alpha laser is maintained and operated under a BMDO contract to TRW. Existing contract vehicles may be viable to launch the SBLRD with appropriate waivers. In FY97, an acquisition strategy will be formulated which may result in a recompetition of the effort for the SBLRD.	Marietta. The ALI and SBLRD design ing contract vehicles may be viable to petition of the effort for the SBLRD.
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RDT&E BUDGET ITEM JUSTIFICATI	JUSTIFICATION SHEET (R-2 Exhibit)	2 Exhibit		DATE Febru	February 1997
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Supp	ne Ipport Tec	אוזונב Support Technologies - ATD	АТБ	РВОЈЕСТ 1360
B. Program Change Summary (\$ in Thousands)				Total	
Previous President's Budget 75,345 Appropriated Value	EY 1997 28,449 108,449	FY 1998 28,971	FY 1999 28,670	Cost 161,435	
Adjustments to Appropriated Value: a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) c. Internal BMDO Adjustments Current Budget Submit/President's Budget	-5,378 -250 -6,981 95,930	28,877	28,539	229,834	
Change Summary Explanation: Funding: Congress increased the FY97 President's Budget Request to continue development of the Space Based Laser to the point where it is a technically viable pution for ballistic missile defense. A portion of the increased funding is used to accelerate completion of the ALI high power test and the HABE active tracking option for ballistic missile defense. A portion of the increased funding is used to begin preparation of the test tests so that results can be used for the design of the SBL Readiness Demonstrator (SBLRD). Remaining increased funding is used to begin preparation of the test facility needed to test the SBLRD, continue the design phase, and initiate procurement for long lead items such as the uncooled optics for the laser resonator and the glass for the 4-meter monolithic mirror. This project is responsive in FY97 to the congressional language accompanying the increased funding. This project continues the SBL program in the outyears at a very low level. It preserves the most critical portions of the infrastructure required to maintain an option of deploying highly effective global defenses in the future. A limited technology development effort is preserved while pursuing an advanced uncooled resonator. Technical: None	s Budget Request to continue development of the Space Based Laser to the point where it is a technically viable the increased funding is used to accelerate completion of the ALI high power test and the HABE active tracking the SBL Readiness Demonstrator (SBLRD). Remaining increased funding is used to begin preparation of the test esign phase, and initiate procurement for long lead items such as the uncooled optics for the laser resonator and tiect is responsive in FY97 to the congressional language accompanying the increased funding. This project ery low level. It preserves the most critical portions of the infrastructure required to maintain an option of future. A limited technology development effort is preserved while pursuing an advanced uncooled resonator.	of the Space Bandletion of the Remaining inc gread items sure all language accortions of the iffort is preserv	ased Laser to the ALI high pover assed funding the nuccocompanying the infrastructure refer while pursuited while pursuited.	e point where it is a twer test and the HAB is used to begin prepoled optics for the lass increased funding. Tquired to maintain ar ng an advanced unco	echnically viable E active tracking aration of the test or resonator and the his project option of oled resonator.
C. Other Program Funding Summary (\$ in Thousands) FY 1996 FY 1997	FY 1998 FY 1999	EY 2000 E	EY 2001 EY 2	FY 2002 FY 2003	To Total Compl Cost
Project 1360	Page 25 of 38 Pages			Exhibit R-2 (PE 0603173C)	3173C)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	V SHEET (R-2 Exhibit)	TE February 1997
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	PROJECT 1360
D. Schedule Profile		
EY 1996	FY 1997 FY 1998	EY 1999
, ,		n
Low power ALI experiments (Series 100) X complete		
gration experiments		
Alpha high power restart test ALI system integration experiments	×	
First ALI high power diagnostics test Space test facility site selection	×:	
ALL closed loop high power test IIA ALL closed loop high power test IIB Passive tracking tests against boosting	× × ×	
scaled rockets Active tracking tests against boosting scaled rocket complete	×	
WSMR active track ground test against full scale boosting target Integrated test of uncooled deformable	×	
mirror HABE Flight - ATP aimpoint mission Fabrication of uncooled rear and outer cone assemblies complete	•	××
Project 1360	Page 26 of 38 Pages Exhibit R.	Exhibit R-2 (PE 0603173C)

RDT&E BUDGET ITEM		TIFICA	TION S	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NI 0 0 0	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	ritle Support T	echnolo	gies - AT	Q	<u>Г</u>	РRОЈЕСТ 1651
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1651 Innovative Science and Technology	0	2,233	0	0	0	0	0	0	TBD	ТВD

Mission Description and Budget Item Justification Š

significantly change how BMD develops future systems. The technologies pursued include: next generation sensors, power, information processing, optics, advanced objectives of these investments are to provide: (1) component technologies that offer improved performance or reduced costs for BMDO acquisition programs; (2) a materials, propulsion and communication. This project causes and exploits breakthroughs in science that will keep BMD at the foremost edge of what is possible. A better understanding of the physical processes to support these acquisition programs; and (3) technical solution options to mitigate unpredicted threats. Unlike other To prepare to meet critical future active defense needs, advanced technology programs invest in an aggressive program of high leverage technologies that yield markedly improved capabilities across a selected range of boost phase and terminal defense interceptors, advanced target sensors, and innovative science. The BMDO projects that fund near term technology and testing efforts, this advanced technology initiative invests seed money in high-risk technologies that could primary project goal is to conduct proof-of-concept demonstrations that transition technology to development programs. Many of today's baseline technologies on BMDO systems like Theater High Altitude Area Defense (TIIAAD), Patriot Advanced Capability (PAC3), and Ground Based telluride ultra-sensitive infrared detectors; 32-bit radiation hardened Reduced Instruction Set Computer (RISC) processors for image analysis; composite materials for lightweight satellite structures; interferometric fiber-optic gyroscopes for sophisticated guidance and control; and solid-state gallium arsenide transmitter/receivers for Radar (GBR) are available due to the wise investment in innovative technologies some 10 years ago. Examples include: indium antimonide and mercury cadmium BMDO radars. The IST program is the only R&D program in the Defense Department focused on future BMDO technical requirements.

FY 1996 (\$ in Thousands):

FY 1997 (\$ in Thousands):

- Power: Complete integration of SCARLET flight array wings. Deliver SCARLET flight system to JPL for integration onto the New Millennium \$2,233
 - spacecraft.

Total

\$2,233

FY 1998 (\$ in Thousands):

- 20 S
- Total

Project 1651

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Exhibit R-2 (PE 0603173C)

RDT&E BUD TEM J	USTIFICATION SHEET (R-2 Exhibit)	ION SH	EET (R	-2 Exhit	oit)		DATE Feb	February 1997	
BUDGET ACTIVITY 3 - Advanced Technology Development		PE NU	PE NUMBER AND TITLE 0603173C Supp	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	olouhoa	gies - AT	٥	PROJECT 1651	ECT
FY 1999 (\$ in Thousands): - \$0 - \$0 Total									
B. Program Change Summary (\$ in Thousands)									
Previous President's Budget	FY 1996 0	EX	FY 1997 0	FY 1998 0	EY 1999 0	89 0	Total Cost 0		
Adjustments to Appropriated Value: a. Internal BMDO Adjustments Current Budget Submit/President's Budget	0	2 2	2,233 2,233	0		0	1,758		
Change Summary Explanation: Funding: Funding changes in 0603173c are due to changes in BMDO priorities. Funding is for hardware development and commercialization that transitioned from technology developed in 1651 IST, PE0602173c. Schedule: Technical:	iges in BMDC) priorities.	Funding is	for hardware	e developm	ent and com	mercialization	that transition	p
C. Other Program Funding Summary (\$ in Thousands)									
FY 1996 1651 Innovative Science and Technology, PE 47,852 0602173C	EY 1997 56,009	FY 1998 50,923	FY 1999 50,094	FY 2000 43,774	EY 2001 41,411	FY 2002 42,505	EX 2003 43,506	To Compl Cont	Total Cost Cont
Project 1651	4	Page 28 of 38 Pages	8 Pages			Exhibi	Exhibit R-2 (PE 0603173C)	03173C)	

RDT&E PROGRAM ELEMENT/PROJEC	NT/PROJECT COST BREAKDOWN (R-3)	E February 1997
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	РРОЈЕСТ 1651
D. Schedule Profile		
FY 1996 1 2 3 4 SCARLET solar array hardware delivery	FY 1997 1 2 3 4 1 2 3 4 X	FY 1999 1 2 3 4
Project 1651	Page 29 of 38 Pages Exhibit R	Exhibit R-3 (PE 0603173C)

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RETAE BUDGET ITEM J	FM JUS	TIFICA.	TION S	HEET (R	USTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NI 090	PE NUMBER AND TITLE 0603173C Supp	TITLE Support T	PENUMBER AND TITLE 0603173C Support Technologies - ATD	gies - AT	Q	Р	РRОЈЕСТ 1660
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1660 Statutory and Mandated Programs	5,399	4,707	4,161	4,113	4,073	4,051	4,293	4,299	4,299 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

programs, and technical solution options to mitigate advanced and To prepare for critical future missile defense needs, advanced technology programs will invest in a balanced program of high leverage technologies that yield improved capabilities across a selected range of boost phase and terminal missile defense interceptors, and target sensors, and innovative science. The objectives of these or acq. investments are component technologies with improved performance or reduced convergence or unpredicted threats.

Two specific programs in advanced technology are managed under this project

- 1. Technology Applications
- 2. Historically Black Colleges and Universities/Minority Institutions (HBCU/MIs)

Incorporation of these technologies by the private sector and other government agencies can result in reduced unit costs and further improvements to be made available The Technology Applications Program, established in 1986, makes technology from all parts of BMDO available to federal agencies, state and local governments, and U.S. business and research interests. The program objective is to develop and support the transfer of BMD derived technology to other Department of Defense applications as well as other federal, state and local government agencies, federal laboratories, universities, and the domestic, commercial, and private sector. for applications in BMDO systems.

The HBCU/MI Program increases and improves the participation of minority colleges and institutions in the BMDO program. It also responds to Section 832 of PL 101-510 which establishes a specific goal for HBCU and MIs within the overall five percent goal for minority business contracts and introduces them to BMDO technologies and the particulars of the BMDO procurement process.

Each program will focus, to the maximum extent feasible, on innovative technologies in support of future BMD sensor and interceptor systems. These systems will require processing, sensor, power, propulsion, materials and BMC3 capabilities beyond those currently being developed. An important goal of each program is to identify, develop, and demonstrate innovative technologies which will dramatically improve BMD system perfince.

FY 1996 (\$ in Thousands):

1	\$808	Database: Completed enhancement of the database, investigated international access to the BMDO technology; and initiated migration to the
		national information infrastructure.
ı	\$554	Panel Reviews: Provided assistance to large, medium and small businesses wishing to bring BMD supported technology to the commercial
		market.

Project 1660

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Exhibit R-2 (PE 0603173C)



2	RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit) DATE Feb	February 1997
BUDGET ACTIVITY 3 - Advanced Te	SUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Support Technologies - ATD	РRОЈЕСТ 1660
- \$422	Outreach: Developed publications, brochures, target arti	Outreach: Developed publications, brochures, target articles for journals and newspapers, quarterly newsletters, conference exhibits, ads and	exhibits, ads and
- 41 203	reports on BMDO technology, etc. Networking: Expanded results of technology transfer by	reports on BMDO technology, etc. Networking: Expanded results of technology transfer by working with other federal technology transfer organizations and activities such as the	ctivities such as the
	OSD Director, DDR&E Office of Technology Transition	OSD Director, DDR&E Office of Technology Transition, NASA and DOE. Interacted with professional/technical associations and societies	ns and societies
	involved with technology transfer and commercialization	involved with technology transfer and commercialization. Initiated new activities to include technology transfer demonstration projects.	on projects.
- \$2,412	HBCU/MI program awarded 3 contracts and incrementally funded 8 contracts.	lly funded 8 contracts.	
- \$5,399	Total		
FY 1997 (\$ in Thousands):			•
- \$850	Database: Maintain up-to-date information on potential	information on potential BMD programs that have commercial applications; and implement graphics and infracturative on BMD enoneored technologies.	grapnics and
- \$650	Panel Reviews: Provide assistance to large, medium and	Interactive modes into transmand in the form that the compositor commons and supported technology to the commercial Panel Reviews: Provide assistance to large, medium and small businesses wishing to bring BMD supported technology to the commercial	e commercial
	market.		
- \$591	Outreach: Develop publications, brochures, target articl	Outreach: Develop publications, brochures, target articles for journals and newspapers, quarterly newsletters, conference exhibits, ads and	hibits, ads and
	reports on BMDO technology, etc.		•
- \$1,200	Networking: Expand results of technology transfer by w	Networking: Expand results of technology transfer by working with other federal technology transfer organizations and activities such as the	vities such as the
	OSD Director, DDR&E Office of Technology Transition involved with technology transfer and commercialization	OSD Director, DDR&E Office of 1 echnology transition, NASA and DOE. Interact with professional technical associations and societies involved with technology transfer and commercialization. Initiate new activities to include technology transfer demonstration profects.	and societies in projects.
\$1.416	HRCII/MI program will award 10 contracts as a farget.		
- \$4.707			
	, order		
FY 1998 (\$ in Thousands):			
~ \$503	Database: Maintain up-to-date information on potential	information on potential BMD programs that have commercial applications. Update graphics and interactive	s and interactive
	modes into national information infrastructure on BMID-sponsored technologies.	modes into national information infrastructure on BMD-sponsored technologies.	e commercial
0/08 -	Fanel Keviews. Frovide assistance to targe, incuring and	i siliali dusilicases wishing to ding divid aupported technology to the	Commission
- \$792	market. Outreach: Develop publications, brochures, target articl	marker. Outreach: Develop publications, brochures, target articles for journals and newspapers, quarterly newsletters, conference exhibits, ads and	hibits, ads and
	reports on BMDO technology, etc.		
- \$879	Networking: Expand results of technology transfer by w	technology transfer by working with other federal technology transfer organizations and activities such as the	vities such as the
	OSD Director, DDR&E Office of Technology Transition	OSD Director, DDR&E Office of Technology Transition, NASA and DOE. Interact with professional/technical associations and societies	and societies
	INVOIVED WITH TECHNIOLOGY HAIRSTET AND COMMISSINGATION	ii. Iiiiiiate new activities to include technology transiel demonstratie	n projects.
- 54.161	Tibe Collett program with incrementally turns to commerce. Total		
Project 1660	Page	Page 31 of 38 Pages Exhibit R-2 (PE 0603173C)	303173C)

RDT&E BUDGET ITEM	ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET (R-2 Exhib	it)	DATE Februs	February 1997
BUDGET ACTIVITY 3 - Advanced Technology Development	l	PE NUMBER AND TITLE 0603173C Supp	Support Te	D TITLE Support Technologies - ATD		PROJECT 1660
FY 1999 (\$ in Thousands): - \$503 Database: Maintain u modes into national ar - \$576 Panel Reviews: Provi	unds): Database: Maintain up-to-date information on potential BMD programs that have commercial applications. Update graphics and interactive modes into national and global information infrastructure on BMD-sponsored technologies. Panel Reviews: Provide assistance to large, medium and small businesses wishing to bring BMD supported technology to the commercial	tial BMD programs cture on BMD-spon	that have comm sored technologi	ercial applicatior les. ng BMD support	ns. Update graphics and ed technology to the co	d interactive
market. - \$792 Outreach: Develop el exhibits, ads and repoint and report and a	market. Outreach: Develop electronic media, publications, brochures, target articles for journals and newspapers, quarterly newsletters, conference exhibits, ads and reports on BMDO technology, etc. Networking: Expand results of technology transfer by working with other federal technology transfer organizations and activities such as the OSD Director DDR & F. Office of Technology Transition NASA and DOE Transition.	rochures, target arti by working with oth	cles for journals er federal techno	and newspapers,	quarterly newsletters, a sanizations and activitie	conference
involved with technology transfer – \$1,397 HBCU/MI program will award 9 – \$4,113 Total	involved with technology transfer and commercialization. Initiate new activities to include technology transfer demonstration projects. HBCU/MI program will award 9 contracts as a target. Total	ation. Initiate new a	or. interact with	n professionaried de technology tra	cinical associations and ansfer demonstration pi	i socienes ojects.
Acquisition Strategy: These competitively awarded programs are in response to annual announcement of research opportunities. Proposals received are judged according to technical and commercial potential.	awarded programs are in respoi ential.	nse to annual annou	ncement of resea	arch opportunitie	s. Proposals received a	ire judged
B. Program Change Summary (\$ in Thousands)	(sp	·				
Previous President's Budget Appropriated Value	EX 1996 4,965	FY 1997 6,476 6,476	FY 1998 12,258	EY 1999 7,595	Total Cost 31,294	
Adjustments to Appropriated Value: a. General Reductions (FFRDC, Inflation etc.) b. Internal BMDO Adjustments Current Budget Submit/President's Budget	etc.) 5,399	-9 -1,760 4,707	4,161	4,113	18,380	
Change Summary Explanation: Funding: Funding changes in Advanced Technology Development (0603173C) are due to changes in BMDO priorities. Schedule: None Technical: None	l Technology Development (060	03173C) are due to o	changes in BMD	O priorities.		
Project 1660	P_c	Page 32 of 38 Pages		ш	Exhibit R-2 (PE 0603173C)	(73C)

RDT&E BUDGET ITEM J	ET ITE	UC M	STIFI	CATI	ON SI	USTIFICATION SHEET (R-2 Exhibit)	R-2 E	xhib	it)		DATE		February 1997	97
BUDGET ACTIVITY 3 - Advanced Technology Development	lopme	nt			PE N	PE NUMBER AND TITLE 0603173C Supp	Suppo	ort Te	chnolo	Support Technologies - ATD	ΛΤD		1	РRОЈЕСТ 1660
C. Other Program Funding Summary (\$ in Thousands)	in Thous	(spue												
The HBCU/MI program feeds novel technologies into all other BMD programs, and the Technology Applications program supports the transfer of technology from all RMD programs	logies inte	o all other	ВМD р.	rograms	, and the	Technolog.	y Applic	ations p	rogram sı	ipports the	transfer	of techr	nology fro	n <u>all</u>
		FY 1996	6 EY 1997		FY 1998	EY 1999		FY 2000	FY 2001	FY 2002		FY 2003	To Compl	Total Cost
D. Schedule Profile														
	-	FY 1996 2 3	3 86	4	1 E	EY 1997 2 3	4	1	FY 1998 2 3		4	- H	FY 1999 2 3	4
Technology Applications Annual Report Special Tech Applications Report BMDO Update	×	××	× ×	××	**	× ×	××	×	××	× ×	× ××	××	× ×	××
HBCU/MI Solicitation/Review for incremental funding	×				'×			×			×	~		
Project 1660				Р	age 33 oj	Page 33 of 38 Pages				EX	hibit R-2	(PE 06	Exhibit R-2 (PE 0603173C)	

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RDT&E BUDGET ITEM J	EM JUS	TIFICA	TION S	HEET (R	USTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NI 060	PE NUMBER AND TITLE 0603173C Supp	ritle Support T	E NUMBER AND TITLE 0603173C Support Technologies - ATD	gies - AT	Q	9. 3.	РRОЈЕСТ 3352
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3352 Modeling & Simulations	0	2,002	1,554	1,898	643	1,512	1,544	1,582	1,582 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

effective approach reduces the need for more costly live fire missile test programs and establishes requirements for future technology needs. It promotes enhancements provide analysis, integration, demonstration, and performance verification of Ballistic Missile Defense (BMD) systems. These facilities and the Joint Missile Defense projected, alternative, and demonstrated performance capabilities of Theater Missile Defense (TMD) and National Missile Defense (NMD) systems. These large and efficient utilization of these facilities and to provide verification, validation, and accreditation (VV&A) of the models, simulations, and systems portrayed. This cost Center (ARC/SC) in Huntsville, AL. These facilities operate in a distributed integrated simulation environment and host the modeling and simulation wargames that Portions of this processing capability are housed at the Joint National Test Facility (JNTF) in Colorado Springs, CO, and the Advanced Research Center/Simulation complex M&S tools require high-performance vector and parallel processing supercomputers, scalar processors, and advanced graphic workstations for operation. Network (JMDN), which links BMD contractors, Services, and other DoD government facilities, are utilized by all Services. Procedures are established to ensure This project provides for the development/modification and validation of modeling and simulation (M&S) techniques and tools that are critical in assessing the of M&S technologies that support: the acquisition process; the development of fielding of operational capabilities; and the development of common tools, methodologies, and protocols beneficial to data exchange, integration of various models and simulations, and software reusability of M&S applications.

sharing approach ensures cooperation, contributes to achieving synergy across the efforts, and minimizes duplication of modeling and simulation resources. The total funding for these facilities is distributed through Project 3352. Three Program Elements (PEs) (NMD, TMD, and Support Technology) provided funding. This cost corresponding increase in NMD funding. These PEs include the costs for operations and maintenance of these facilities which includes: computer hardware and funding profile remains flat on an annual basis, with adjustments for inflation. For example, the decrease in TMD funding for JNTF in FY97 is offset by a software; communications networks; security; and other essential capabilities necessary to develop and operate configurable, multiple experiment test bed environments. This document describes the support technology portion of funding for these activities.

FY 1996 (\$ in Thousands):

- **∽**
- , e

Project 3352

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Exhibit R-2 (PE 0603173C)

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RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET	(R-2 Exhibi	t	DATE February 1997	997
BUDGET ACTIVITY 3 - Advanced Tec	SUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603173C Supi	D ТПLE Support Technologies - ATD	hnologies -	ATD	PROJECT 3352
EY 1997 (\$ in Thousands) - \$2,002 This is ba is ba CFD CFD cstat mult - \$2,002 Total	task supports the moderniz sed on supporting BMDO is Analysis, NMD Architectolishment of a wide area ne imedia applications; replacysis.	s computer capabili hese priorities incl ISR. Upgrade of h ide supercomputers onal resources; and	ties throughout the BMD wargam ost processing resto support M&S implement nearli	BMDO. The aces, TMD COEA ources to address implementation ne and online me	ration of the BMDO's computer capabilities throughout the BMDO. The acquisition of equipment to modernize program priorities. These priorities include BMD wargames, TMD COEA Phase II, TMD Architecture Analysis, use Analysis, and C4/ISR. Upgrade of host processing resources to address inadequate user response time; twork (WAN); upgrade supercomputers to support M&S implementation of new technology to support e obsolete computational resources; and implement nearline and online mass storage to support user software	odernize Analysis, me; ort oftware
FY 1998 (\$ in Thousands): - \$1,554 Continue is base estab replate replate Total	nue to support the moderned on supporting BMDO jlishment of a WAN; upgrae obsolete computational	o's computer capabiontine upgrade of continue upgrade of o support M&S in sment nearline and	lities throughout i host processing r pplementation of i online mass storag	he BMDO. The esources to addre new technology t ge to support user	ization of the BMDO's computer capabilities throughout the BMDO. The acquisition of equipment to mode program priorities. Continue upgrade of host processing resources to address inadequate user response time; ade supercomputers to support M&S implementation of new technology to support multimedia applications resources; and implement nearline and online mass storage to support user software analysis.	modernize time; ations;
FY 1999 (\$ in Thousands): - \$1,898 Continue is base techn - \$1,898 Total	nue to support the modern ed on supporting BMDO o ology to support multime	ontinue upgrade of ontinue upgrade of options obsolete con	lities throughout i supercomputers iputational resour	he BMDO. The to support M&S ces.	nization of the BMDO's computer capabilities throughout the BMDO. The acquisition of equipment to program priorities. Continue upgrade of supercomputers to support M&S and implementation of new ita applications and replace obsolete computational resources.	modernize
Acquisition Strateg. B. Program Change St	Acquisition Strategy: The tasks in this project have been met through full and open contractual competition to support Technology Follow-on M&S requirements. B. Program Change Summary (\$\frac{1}{2}\$ in Thousands)	and open contractu	al competition to	support Technolo	ogy Follow-on M&S require	ments.
Previous President's Budget Appropriated Value	FY 1996 dget 0	FY 1997 1,459 1,459	FY 1998 1,559	FY 1999 1,907	Total <u>Cost</u> 4,925	
Adjustments to Appropriated Value. a. General Reductions (FFRDC, Inflab. Internal BMDO Adjustments Current Budget Submit/President's Budget	tion etc.)	-2 545 2,002	1,554	1,898	5,454	
Project 3352	Pe	Page 35 of 38 Pages		Ш	Exhibit R-2 (PE 0603173C)	

RDT&E BUDGET ITEM J	EM JUST	IFICAT	HS NO!	EET (R	USTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Fet	February 1997	
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NU 060	PE NUMBER AND TITLE 0603173C Supp	TLE upport Te	Support Technologies - ATD	ies - ATI		PR.	PROJECT 3352
Change Summary Explanation: Funding: None Schedule: None Technical: None										
C. Other Program Funding Summary (\$ in Thousands)	<u>sands)</u>								Ē	F
2400 NMD Program, PE 0603871C 3352 Modeling and Simulation, PE 0603872C	FY 1996 730,656 71,362	EY 1997 828,864 64,180	FY 1998 504,091 73,173	EY 1999 393,085 72,984	EX 2000 309,748 74,939	EY 2001 309,584 74,961	EY 2002 391,858 78,333	FY 2003 392,433 75,661	Compl Cont Cont	Cont
D. Schedule Profile	·									
None	FY 1996 2 3	4	1 2	EY 1997 2 3	4 1	FY 1998 2 3	8 E 4	1	EY 1999 2 3	4
		-								
Project 3352		·	Page 36 of 38 Pages	8 Pages			Exhibil	Exhibit R-2 (PE 0603173C)	6031730)	, · · · ;

RDT&E BUDGET ITEM		JUSTIFICATION SHEET (R-2 Exhibit)	TION SE	HEET (R	2 Exhil	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 3 - Advanced Technology Development	ent		PE NL 060	ENUMBER AND TITLE 0603173C Support Technologies - ATD	ritle upport T	echnolo	gies - AT	O	P. 4	РРОЈЕСТ 4000
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
4000 Operational Support	200	26,907	30,206	31,992	31,190	31,946	33,445	34,207	34,207 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

This project provides support in three basic areas: personnel and related support costs; funding to meet cost fluctuations and contract terminations; management overhead required for the Support Technology program.. Personnel and related support costs common to all Support Technology projects include support of the Office of the Director, Ballistic Missile Defense Organization and his staff located within the Washington, DC area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, U.S. Army PEO Missile Defense, U.S. Navy PEO for Theater Defense, U.S. Air Force PEO office, and the National Test Facility. This project supports funding for overhead/indirect personnel costs, benefits, and infrastructure costs such as rents, utilities, supplies, etc. The BMDO prioritizes funding within this project to meet operational, contractual, and statutory fiscal requirements for the Support Technology program. Operational terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts. requirements include reimbursable services acquired through the Defense Business Operating Fund (DBOF), such as accounting services provided by the Defense Finance and Accounting Service (DFAS). Contractual requirements include reserves for special termination costs on designated contracts and provisions for Finally, statutory requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.

and information management. These efforts include assessment of technical project design, development and testing, test planning, assessment of technology maturity Assistance required to support BMDO overhead management functions for the Support Technology program is contained in this project. This assistance ranges from supplement the BMDO government personnel. Typical efforts include cost estimating, security management, contracts management, strategic relations management schedule, cost, and performance, with attendant documentation of the many related programmatic issues. The requirement for this area is based on most economical and technology integration across BMDO projects; and support of design reviews and technology interface meetings. Program control tasks include assessment of operational contracts to fully support functions such as ADP operations, Access control offices, and graphics support, to supportive efforts required, as well as to and efficient utilization of contractors versus government personnel. The Fiscal Year 1996 Defense Authorization Act eliminates the management program element effective with the Fiscal Year 1997 President's Budget submission. This overhead management and indirect program support funding has been realigned in accordance with Public Law 104-106.

FY 1996 (\$ in Thousands):

Provide management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies. \$200

Project 4000

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Exhibit R-2 (PE 0603173C)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	TIFICATIO	N SHEET (R-2 Exhibi	t)	DATE February 1997	y 1997
™ ed Tech		PE NUMBER AND TITLE 0603173C Supp	Support Tec	PE NUMBER AND TITLE 0603173C Support Technologies - ATD		PROJECT 4000
- \$200 Total						
FY 1997 (\$ in Thousands): - \$26,907 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies. - \$26,907 Total	support for overh	ead/indirect fixed	costs such as civ	rilian payroll, tra	vel, rents & utilities and	supplies.
FY 1998 (\$ in Thousands): - \$30,206 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies. - \$30,206 Total	support for overh	ead/indirect fixed	costs such as civ	rilian payroll, tra	vel, rents & utilities and	supplies.
FY 1999 (\$ in Thousands): - \$31,992 Continue providing management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies. - \$31,992 Total	support for overh	ead/indirect fixed	costs such as civ	'ilian payroll, tra	vel, rents & utilities and	supplies.
B. Program Change Summary (\$\sumshipse in Thousands)						
Previous President's Budget Appropriated Value	FY 1996 0	FY 1997 27,284 27,284	FY 1998 31,561	<u>EY 1999</u> 33,106	Total <u>Cost</u> 91,951	
Adjustments to Appropriated Value: a. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	200	-375 26,907	30,206	31,992	89,305	
Change Summary Explanation: Funding: Management costs realigned to technical program elements effective with FY 1997. Schedule: None Technical: None	ram elements effe	ctive with FY 199	7.			
Project 4000	Pag	Page 38 of 38 Pages			Exhibit R-2 (PE 0603173C)	'3C)

RDT&E BUDGET ITEM		TIFICA	TION SE	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NU 060 Sys	PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	пт <u>к</u> heater H ID	igh-Altitu	ıde Area	Defense		РРОЈЕСТ 2260
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2260 Theater High Altitude Area Defense	565,818	341,307	294,647	16,778	0	0	0	0	TBD	ТВО

A. Mission Description and Budget Item Justification

state, X-band radar technology. THAAD will be interoperable with both existing and future air defense systems. This netted and distributed BM/C4I architecture will interceptor fire control, external sensor cueing, and launch and impact point estimates for the THAAD System. The THAAD Radar is based on state-of-the-art, solid-The Theater High Altitude Area Defense (THAAD) System is being designed to negate theater ballistic missiles (TBM) at long ranges and high altitudes. Its longincludes missiles, Palletized Loading System (PLS) launchers, Battle Management/Command, Control, Communications, Computers, Intelligence (BM/C4I) units, IHAAD Radars, and support equipment. The THAAD Radar (formerly known as Ground Based Radar) provides threat early warning, threat type classification, range intercept capability will make possible the protection of broad areas, dispersed assets, and population centers against TBM attacks. The THAAD System provide robust protection against the TBM threat spectrum. THAAD is pursuing integration of THAAD BM/C4I with the Project Manager (PM), Air Defense Command and Control Systems (ADCCS) to take advantage of previous Army developments that can be incorporated into the THAAD program.

11 flight tests. The residual hardware resulting from the THAAD Dem/Val program, including the User Operational Evaluation System (UOES) missile option, will be Radars and support equipment. The THAAD system design will be developed and tested in the Engineering, Manufacturing, and Development (EMD) phase leading to The Demonstration/Validation (Dem/Val) program will develop a design for the objective THAAD system and demonstrate the capabilities of the system in a series of available for limited use as a contingency capability during a national emergency. The UOES will consist of 40 missiles with 4 launchers, 2 BM/C4I units, 2 THAAD used for a prototype system called the UOES. The UOES, used primarily for early operational assessment and for soldiers to influence the final design, will also be low rate initial production and subsequent fielding in FY 04.

During FY95 - FY98 the Dem/Val flight test program will be conducted at White Sands Missile Range (WSMR), New Mexico. The flight test schedule consists of seventh flight planned for February 1997. The targets for the flight test program are being developed under the Tactical Missile Defense Targets contract (Project flight and system tests which began on April 21, 1995 with a successful first flight of the THAAD missile. To date, six flight tests have been conducted with the

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy

The THAAD Program continued Dem/Val hardware and software design, development and delivery in support of integration and acceptance testing for flight

Project 2260

Page 1 of 8 Pages

Exhibit R-2 (PE 0603861C)

R	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
BUDGET ACTIVITY 4 - Demonstratio	BUDGET ACTIVITY 4 - Demonstration and Validation S	PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	PROJECT 2260
Dem/val Radar hz May 3, 1996, and Dem/val flight tes separation, seeker command destruct THAAD Energy M response to planne collected critical sa 13, 1995, much su seeker and integral interceptor and the events, times, and performance whicl critical data was ob	testing at WSMR. The first Dem/val THAAD radar was delivered to WSMR on July 17, 1995, and has participated in flights 3, 4, 5, and 6. The THAAD Dem/val Radar has performed in the shadow mode to the test range radar and will be the primary sensor on flight 7. The first UOES Radar was delivered to WSMR May 3, 1996, and completed range integration and test in September 1996. It will be used for flight testing beginning with flight 8 and for the remainder of the Dem/val flight tests. The first flight was successfully conducted at WSMR on April 21, 1995, proving the THAAD missile propulsion system booster/kill vehicle separation, seeker shroud cover deployment, seeker data, uplink/downlink communications from the Radar Interface Unit (RUU) to the missile, and pre-planned command destruct. The second flight was conducted on July 31, 1995, as a planned non-intercept, guidance and control test. The missile successfully maneuver which resulted in nominal velocities and accelerations. The kill vehicle successfully maneuver which resulted in nominal velocities and accelerations. The kill vehicle successfully maneuvered in response to planned in-Flight Target Updates (IFTUS). The third flight was non-intercept fly-by test against a Storm target on October 13, 1995. The missile collected critical seeker data and the BMCAI generated the fire control solution and sent the launch command to the interim launcher. During flight 4, on December 13, 1995, much success was demonstrated end game homing. During flights 4, 5, and 6, the THAAD Radar successfully for the first time, and the target. During flights 4 and 6, it properly maintained track on the interceptor and seeker shrouds during shroud separation. All radar mission events, times, and durations, went as predicted in pre-mission analysis. Flight 6 was conducted July 15, 1996. Data analysis is being performed to seeker viewed the target.	July 17, 1995, and has participated in flights 3, 4, 5, 1l be the primary sensor on flight 7. The first UOES II be used for flight testing beginning with flight 8 and pril 21, 1995, proving the THAAD missile propulsion unications from the Radar Interface Unit (RIU) to the ted non-intercept, guidance and control test. The minimal velocities and accelerations. The kill vehicle sun-intercept fly-by test against a Storm target on Octond sent the launch command to the interim launcher of accomplished. The PLS launcher was used succent flights 4, 5, and 6, the THAAD Radar successfully the interceptor and seeker shrouds during shroud so was conducted July 15, 1996. Data analysis is being omponent failure in the missile seeker. An intercept	and 6. The THAAD Radar was delivered to WSMR id for the remainder of the on system booster/kill vehicle e missile, and pre-planned issile successfully performed the occessfully maneuvered in ober 13, 1995. The missile . During flight 4, on December ssfully for the first time, and the y tracked both the THAAD paration. All radar mission performed to assess the segment was not achieved, however,
J	r Contracts: Began THAAL nued system flight testing a R integration of the UOES cterization tests at WSMR.	system flight tests with BMC4I, THAAD Radar and PLS launcher. Completed flight tests 3-6 at WSMR. nalysis. Continued THAAD system ground testing to mitigate flight test risk. Completed fabrication and #1 Radar. Completed fabrication of UOES #2 Radar and delivered to WSMR. Continued THAAD Radar Conducted System Design Review.	d flight tests 3-6 at WSMR. Completed fabrication and Continued THAAD Radar
- \$ 62,900	Support Contracts: Continued software independent verification and validation. Continued nuclear environment survivability analysis. Continued hit assessment, discrimination, and guidance, navigation and control algorithm development. Continued hit to kill lethality analysis. Continued integration and support of THAAD flight testing.	ation and validation. Continued nuclear environmer vigation and control algorithm development. Contin	nt survivability analysis. med hit to kill lethality analysis.
- \$52,333	Integration by Prime Contractor: Continued integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C4I, weapon system deck model, and simulation efforts. Continued system threat vulnerability assessment. Maintained integrated logistics and product assurance efforts. Provided system engineering support to THAAD flight tests to validate test results with predicted performance simulations. Continued pursuing integration of THAAD BM/C4I with the PM, ADCCS, to take advantage of previous Army developments of force operations software.	testing of Joint Tactical Information Distribution Sy on efforts. Continued system threat vulnerability ass gineering support to THAAD flight tests to validate if THAAD BM/C4I with the PM, ADCCS, to take a	sesment. Maintained integrated test results with predicted dyantage of previous Army
- \$19,700 - \$41,375	In-house support: Maintained government salaries and benefits, travel, training. Targets: Continued development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintained infrastructure to support TMD targets.	efits, travel, training. support THAAD flight tests and THAAD Radar syst	tem tests. Maintained
Project 2260	Page 2	Page 2 of 8 Pages Exhibi	Exhibit R-2 (PE 0603861C)





RE	Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	n and Validation PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	PROJECT Defense 2260
- \$3,907 - \$2,603 - \$565,818	Lethality Analysis - Continued lethality simulation code validation. Operational Test and Evaluation (OT&E) - Conducted independent assessment of the THAAD System. Total	
EY 1997 (\$ in Thousands): - \$212,808 Majo integi	Major Contracts: Continue system flight test program and support. Conduct Radar System Test #1 (RST-1). Complete fabrication and integration of UOES radars. Conduct THAAD Radar characterization tests at United States Army Kwajalein Atoll (USAKA) in conjunction with the Theater Critical Measurements Program (TCMP)-2. Conduct Software Specification Review and SDR update. Exercise the UOES missile option. Begin procurement and fabrication of UOES missile components.	omplete fabrication and oll (USAKA) in conjunction update. Exercise the UOES
- \$42,463	Support Contracts: Continue software independent verification and validation. Continue nuclear environment survivability analysis. Continue hit assessment, discrimination, and guidance, navigation and control algorithm development. Continue hit to kill lethality analysis. Continue	urvivability analysis. Continue Hethality analysis. Continue
- \$56,629	Integration and support 111/ADD right testing. Government Furnished Equipment (GFE)/Other: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C4I, weapon system deck model, and simulation efforts. Continue system threat vulnerability assessment. Maintain integrated logistics and product assurance efforts. Provide system engineering support to THAAD flight tests to validate test results with predicted performance simulations. Continue pursuing integration of THAAD BM/C4I with PM, ADCCS to take advantage of previous Army	Distribution System (JTIDS) nerability assessment. Maintain validate test results with e advantage of previous Army
- \$20,590 - \$5,450	developments of force operations software. In-house support: Maintain government salaries and benefits, travel, training. Targets: Continue development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintain infrastructure	n tests. Maintain infrastructure
- \$1,594 - \$1,773 - \$341,307	to support 1 MD targets. Operational Test and Evaluation (OT&E): Conduct independent assessment of the THAAD System. Small Business and Innovative Research Total	
FY 1998 (\$ in Thousands): - \$194,368 Majo - \$30,500 Supp hit as integi	Major Contracts: Continue fabrication and integration of UOES missiles. Complete system flight test program and support. Support Contracts: Continue software independent verification and validation. Continue nuclear environment survivability analysis. Continue hit assessment, discrimination, and guidance, navigation and control algorithm development. Continue hit to kill lethality analysis. Continue integration and support THAAD flight testing.	and support. urvivability analysis. Continue I lethality analysis. Continue
Project 2260	Page 3 of 8 Pages Exhibit	Exhibit R-2 (PE 0603861C)

RE	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) PATE February 1997	1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	РРОЈЕСТ 2260
- \$30,100 - \$21,500 - \$14,234 - \$2,367 - \$1,578 - \$294,647	Integration by Prime Contractor: Continue integration and testing of Joint Tactical Information Distribution System (JTIDS) radios, launch support, BM/C4I, weapon system deck model, and simulation efforts. Continue system threat vulnerability assessment. Maintain integrated logistics and product assurance efforts. Provide system engineering support to THAAD flight tests to validate test results with predicted performance simulations. Continue pursuing integration of THAAD BM/C4I with PM, ADCCS to take advantage of previous Army developments of force operations software. In-house support: Maintain government salaries and benefits, travel, training. Targets: Continue development and delivery of targets to support THAAD flight tests and THAAD Radar system tests. Maintain infrastructure to support TMD targets Lethality Analysis: Continue lethality simulation code validation. Operational Test and Evaluation (OT&E): Conduct independent assessment of the THAAD System. Total	launch tegrated cted y frastructure
FY 1999 (\$ in Thousands): - \$16,778 Comy - \$16,778 Total Acquisition Strategy The Tl launchers, and BM/C41. Th phase, completed in 1992, in competitively awarded to Lc contract contains an option 1 (formerly known as TMD-G development and test of the	EV 1999 (\$ in Thousands): - \$16,778 Completes funding of the UOES missiles. - \$16,778 Total Acquisition Strategy approved for the Dem/Val phase specified full and open competition for THAAD system integration, missiles, launchers, and BM/C41. The TMAD Acquisition Strategy also specified full and open competition for Dem/Val. The Concept Definition phase, completed in 1992, involved three contractor teams and defined concepts and preliminary designs for the THAAD System. The THAAD Dem/Val contract was competitively awarded to Lockheed Missiles and Space Company in September 1992. The Dem/Val program will develop a design for the THAAD System, and the competitively an application for production of the 40 UOES missiles based on the design demonstrated in the Dem/Val flight test program. The THAAD System, and the development and test of the Dem/Val TMD-GBR and two UOES TMD-GBRs.	ion, missiles, Definition contract was m, and the adar ie
Project 2260	Page 4 of 8 Pages Exhibit R-2 (PE 0603861C)	_©
	64	

RDT&E BUDGET ITEM	JUSTIFICATION SHEET (R-2 Exhibit)	ION SHEE	T (R-2 Exhil	oit)		DATE Februa	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603861C Thea System - TMD	PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	igh-Altitu	de Area I	Jefense	PROJECT 2260
B. Program Change Summary (\$ in Thousands)		:				Total	
Previous President's Budget Appropriated Value	EY 1996 554,755	FY 1997 269,000 344,000	FY 1998 0	FY 1999 0		Cost 823,755	
Adjustments to Appropriated Value: a. General Reductions (FFRDC, Inflation etc.) FY 1998 President's Budget Request	565,818	-2,693 *341,307	294,647	16,778		1,218,550	
 Change Summary Explanation: *Funding: A request has been submitted to reprogram FY 97 EMD funds to Dem/Val. FY 98 and FY 99 funds were realigned due to the slip in the THAAD flight test schedule. Schedule: The Milestone II DAB Review milestone has slipped due to longer than expected Flight 6 failure investigation and Flight 7 preparation. The Flight 6 failure investigation caused Flight 7 to move from September to December 1996. An inertial measurement unit software error, found during software verification testing of FTV-07, further delayed the flight test to late February 1997. Technical: None 	gram FY 97 EMD fine has slipped due to September to Dece o late February 1997	ınds to Dem/Val. o longer than exp mber 1996. An i	FY 98 and FY 99 ected Flight 6 failu nertial measureme	funds were ri ire investigati nt unit softwa	saligned due on and Fligl re error, fou	to the slip in the nt 7 preparation. nd during softwa	: THAAD fligh The Flight 6 are verification
C. Other Program Funding Summary (\$ in Thousands)	a						·
THAAD Procurement, SSN C494000* THAAD MILCON, 0604861C THAAD EMD, 0604861C	X 1996 FX 1997 0 0 13,104 0 0 277,508	EY 1998 FY 0 4,565 261,480 578	FY 1999 FX 2000 0 0 578,467 603,213	FY 2001 33,785 584,561	FY 2002 531,715 413,884	EY 2003 606,315 4,994 372,674	Cont Cont Cont Cont Cont Cont Cont Cont
* IN ARMY TOA							
Project 2260		Page 5 of 8 Pages	Si		Exhibit	Exhibit R-2 (PE 0603861C)	161C)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	PROJECT B Area Defense 2260
D. Schedule Profile 1 2 3 4 Dem/Val Radar Integration and Test (1&T) Complete System Design Review UOES Radar 1 1&T Complete Radar System Test #1 UOES Option Award UOES Radar 2 1&T Complete Software Specification Review Integrated System Tests Complete Radar System Test #2 Milestone II 1st UOES Missile Delivery	EY 1997 2 3 4 1 2 3 X X X X X X X X	FY 1999 4 1 2 3 4 X
Project 2260	Page 6 of 8 Pages	Exhibit R-2 (PE 0603861C)



RD.	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	SRAM EL	EMENT/F	ROJECT	COST B	REAKDO	OWN (R-	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Va	lidation			PE NUMBER AND TITI 0603861C The System - TMD	PE NUMBER AND TITLE 0603861C Theat System - TMD	er High-Al	ре NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	a Defens		РRОЈЕСТ 2260
A. Project Cost Breakdown (\$ in Thousands)	reakdown (\$ in '	[housands]					:	:			
				FY 1996		FY 1997	FY 1998	FY 1999			
a. Prime Contract b. Other Government Activities	ent Activities			383,000 52,333	7	212,808 56,629	194,368 30,100	16,778 0			
	ts ement			62,900		42,463 20,590	30,500 21,500	0 0			
				41,375		5,450	14,234	00			
t. Lethality g. OT&E				2,603		1,594	1,578	0			
h. Small Business Innovative Research Total	Innovative Resea	rch		0 565,818	. 34	1,773 341,307	0 294,647	0 16,778			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ition History and	d Planning In	formation (S i	n Thousands)							
Performing Organizations:	nizations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations LMMS CPFF RAYTHEON CPIF/CPAF	ent Organizations CPFF CPIF/CPAF	oct 97			988,344 430,034	293,494 89,506	181,745 31,063	194,368	16,778		1,674,729
Support and Management Organizations SETA C/CPAF Oct Other Spt Cont Various Mu OGAs MIPR Mu	cement Organizat C/CPAF Various MIPR	ions Oct 97 Multiple Multiple			212,338 131,054	23,200 39,700 53,033	16,700 25,763 58,219	11,050 19,450 29,600	0 0 0		50,950 297,251 271,906
Project 2260				1	Page 7 of 8 Pages	res		Exhi	bit R-3 (PE	Exhibit R-3 (PE 0603861C)	

RDT&E PROGRAM ELEMENT/PROJECT	GRAM EL	EMENT/P	ROJECT	COST BREAKDOWN (R-3)	REAKDO	WN (R-	<u>∞</u>	DATE Fe	February 1997	766
BUDGET ACTIVITY 4 - Demonstration and Validation	alidation			PE NUMBER AND TITLE 0603861C Thea System - TMD	AND TITLE IC Theate	r High-Al	PE NUMBER AND TITLE 0603861C Theater High-Altitude Area Defense System - TMD	a Defens		PROJECT 2260
Contractor or Contract Government Method/Type Performing or Funding Activity Vehicle SBIR	Award or Obligation Date	Performing Activity <u>EAC</u>	Project Office EAC	Total Prior to F <u>Y 1996</u>	Budget FY 1996	Budget F <u>Y 1997</u> 1,773	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program 1,773
Test and Evaluation Organizations WSMR MIPR OCT 97 OT&E TARGETS LETHALITY B. Budget Acquisition History and Planning Information Continued (\$\mathbf{S}\$ in Thousands)	OCT 97 od Planning Inf	ormation Con	tinued (\$ in T	27,531 1,500 61,245 7,200 housands)	19,000 2,603 41,375 3,907	19,000 1,594 5,4 · · ·	22,000 1,578 14,234 2,367	0 0 0		87,531 7,275 122,304 13,474
Government Furnished Froperty: Contract Method/Type Item Or Funding Description Vehicle	: Award or Obligation Date	Delivery <u>Date</u>		Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total <u>Program</u>
Product Development Property N/A				0	0	0	0	0	,	
Support and Management Property N/A				0	0	0	0	0	0	
Test and Evaluation Property N/A			•	0	0	0	0	0	0	
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation				1,418,378 343,392 97,476	383,000 115,933 66,885	212,808 102,455 26,044	194,368 60,100 40,179	16,778		2,225,332 621,880 230,584
Total Project				1,859,246	565,818	341,307	294,647	16,778		3,077,796
Project 2260			Pe	Page 8 of 8 Pages	Si		Exh	Exhibit R-3 (PE 0603861C)	0603861C)	

RDT&E BUDGET ITEM	EM JUS	TIFICA	TION SI	неет (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Feb	Februuary 1997	997
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 0 0 0	PE NUMBER AND TITLE 0603863C HAW	E NUMBER AND TITLE 3603863C HAWK Upgrades TMD	grades I	QW.		9 2	PROJECT 2358
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2358 HAWK System BM/C3	22,819	0	0	0	0	0	0	0	ТВО	TBD

A. Mission Description and Budget Item Justification

engagement of short-range TBMs and thereby provides a point defense Theater Missile Defense (TMD) capability to the Marine Air Ground Task Force. The program will also provide a communications interface between the AN/TPS-59 and the HAWK system by developing an Air Defense Communications Platform (ADCP). This Marine The program consists of modifying the U.S. Marine Corps AN/TPS-59 long-range air surveillance radar and the HAWK weapon system to allow detection, tracking, and Corps TMD initiative is jointly funded with BMDO and will yield a low-risk, near-term capability for expeditionary forces against short-range ballistic missiles.

enhanced to provide a TBM tracking and surveillance capability. The radar completed operational test and evaluation in FY 96 and initial modification kit production will The AN/TPS-59 long-range surveillance radar is the primary sensor for the Marine Air Control Squadron. The (V3) configuration developed under this program was begin in FY 97. Installation of the modification kits is scheduled to begin in FY 98 and complete in FY99.

lethality missile will incorporate fuse and warhead improvements to 300 improved lethality missiles that have been transferred from the Army to the Marine Corps. Another 700 improved lethality missile modification kits will be procured and installed by the end of Fiscal Year 1997. Production of the BCP modification kits began in Fiscal configuration called the "improved lethality missile." The modified HAWK BCP will process cueing data to control the high power illuminator radar. The improved The HAWK weapon system modifications include upgrades to the Battery Command Post (BCP) and improvements to the HAWK missile that resulted in a missile Year 1995 and the installation of all BCP modifications was completed by the end of Fiscal Year 1996.

communications interface has completed operational test and evaluation and initial production will begin in Fiscal Year 1997. Fielding of the ADCP is scheduled to begin in The Air Defense Communications Platform (ADCP) will convert AN/TPS-59 data messages and Tactical Data Information Link-J (TADIL-J) formatted messages into the intra-battery data link formats required by the HAWK weapon system. The ADCP will also transmit TADIL-1 formatted messages to other theater sensors. This FY98 and complete in FY99.

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense

					Page 1 of 3 Pages
onsands):	Complete AN/TPS-59 integration and testing.	Complete ADCP integration and testing.	Provide targets for live flight testing.	Total	
FY 1996 (\$ in Thousands):	- \$20,074	- \$2,452	- \$293	- \$22,819	Project 2358

Exhibit R-2 (PE 0603863C)

RDT&E BUDGET ITEM JUSTIFICA	USTIFICATION SHEET (R-2 Exhibit)	(R-2 Exhit	oit)		DATE Febr	Februuary 1997	7
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603863C HAW	PE NUMBER AND TITLE 0603863C HAWK Upgrades TMD	grades T	MD		PROJEC 2358	PROJECT 2358
FY 1997 (\$ in Thousands): - \$ BMDO participation in the program is completed in FY 1996. - \$0 Total	in FY1996.						
FY 1998 (\$ in Thousands): - \$ BMDO participation in the program is completed in FY 1996. - \$0 Total	in FY1996.						
FY 1999 (\$ in Thousands): - \$ BMDO participation in the program is completed in FY 1996. - \$0 Total	in FY1996.						
B. Program Change Summary (\$ in Thousands)							
FY 1996 Previous President's Budget Current Budget Submit/President's Budget	EY 1997 2 0 9 0	EY 1998 0 0	FY 1999 0	88 0 0	Total Cost		
Change Summary Explanation: Funding: Total funding remained unchanged, however adjustments were required to the individual tasks in order to accurately reflect the actuals (AN/TPS-59 integration testing from \$20,102 to \$20,074, ADCP integration and testing from \$2,430 to \$2,452 and targets from \$287 to \$293). Schedule: The additional 700 improved lethality missile modification kits were scheduled to be procured and installed by the end of FY96. This date changed to the end of FY97 due to a protest which delayed the award of the modification kit contract. Milestone III dates were changed in FY95 in conjunction with changes to the test schedule which slipped developmental testing to 1st quarter FY96 and operational testing to 4th quarter FY96. Technical: None	iver adjustments were required to the individual tasks in order to accurately refintegration and testing from \$2,430 to \$2,452 and targets from \$287 to \$293). iissile modification kits were scheduled to be procured and installed by the encaward of the modification kit contract. Milestone III dates were changed in Fisting to 1st quarter FY96 and operational testing to 4th quarter FY96.	ndividual tasks \$2,452 and tark of to be procured Milestone III of III	in order to acgets from \$2. Jand installe lates were ch	ccurately ref 87 to \$293), d by the enc nanged in F7 96.	flect the actua f of FY96. TI Y95 in conjun	ls (AN/TPS-5 his date chan; iction with ch	9 ged to anges
C. Other Program Funding Summary (\$ in Thousands)							
FY 1996 FY 1997 HAWK Procurement 5,046 19,379	FY 1998 FY 1999	9 FY 2000	FY 2001	FY 2002	FY 2003	To Compl	Total Cost
Project 2358	Page 2 of 3 Pages			Exhibi	Exhibit R-2 (PE 0603863C)	03863C)	



RDT&E BUDGET ITEM	T ITEM		ICAT	NO NO	JUSTIFICATION SHEET (R-2 Exhibit)	₹-2 E>	chibit			DATE		Februnary 1997	1997
BUDGET ACTIVITY 4 - Demonstration and Validation	_ ا			<u></u> 0	PE NUMBER AND TITLE 0603863C HAW	D TITLE HAWK Upgrades TMD	Upgra	ades T	QW.				PROJECT 2358
D. Schedule Profile													
	1 2	FY 1996 2 3	4		FY 1997 2 3	4	_	FY 1998 2 3	3 88	4	_	EY 1999 2 3	4
Acquisition Milestone: AN/TPS-59 Milestone III ADCP Milestone III				×	×								
T&E Milestone: AN/TPS-59 Development Tests AN/TPS-59 Operational Tests ADCP Development Tests ADCP Operational Tests	× ×		× ×										
Other Program Events: AN/TPS-59 Mod Fielding ADCP Fielding							××	××	××	××	××	× ×	
Project 2358				Page 3	Page 3 of 3 Pages				ú	hibit R-	2 (PE 06	Exhibit R-2 (PE 0603863C)	

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RDT&E BUDGET ITEM	•	TIFICA	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	2-2 Exhi	bit)		DATE Fel	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603864C Battle Management and C41 for TMD Acquisition	וודרב Sattle Mai	nagemer	it and C4	1 for TMI		РРОЈЕСТ 3261
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3261 TMD BM/C3I (BM/C3I Concepts	27,147	0	0	0	0	0	0	0	твр	ТВD

A. Mission Description and Budget Item Justification

Control, Communications, and Intelligence (BM/C3I) capability having the flexibility to meet a wide range of threats and expected needs. The BM/C3I architecture for sensors, interceptors, and C2 nodes and to synergize their individual contributions to an integrated Joint theater-wide TMD system. BMDO has three major thrusts to The primary mission of this project is to provide the warfighter with an integrated and interoperable Theater Missile Defense (TMD) Battle Management/Command, TMD is built upon the existing command and control (C2) structure for Theater Air Defense (TAD) and adds the communications linking TMD C2 nodes, weapons, independent weapon systems development and to provide guidance, standards, equipment, integration, and analysis to maximize the performance of a multitude of and sensors, and the TMD interfaces to intelligence systems and other supporting capabilities. The BMDO, from its joint perspective, uses this project to oversee he TMD BM/C3I integration program.

intelligence systems external to TMD. This project supports the system engineering of their capability and prototype development of items such as improved displays The first thrust establishes the links and means for receipt and in-theater early warning and dissemination of launch warning information from space-based and for early in-theater warning information. This project focuses on linking separate external systems into the theater.

Distribution System (JTIDS) and the Tactical Data Information Link-JTIDS (TADIL-J) message format. This project integrates JTIDS terminals into existing Theater communications equipment, and protocols as well as the common command and control procedures among different weapons systems to ensure a truly integrated Ballistic Missile Defense (TBMD) C2 platforms and provides the necessary software upgrades. This funding is critical for timely inter-Service interoperability. The second thrust of the BM/C31 program focuses on communication of, and interoperability among, TMD weapon systems. Interoperability includes both the theater-wide ballistic missile defense system. The comerstone of TMD interoperability is the Joint Data Net (JDN) which uses the Joint Tactical Information

The third thrust of the BM/C3I program directs attention to upgrades of Service C2 centers. Various command center upgrades are included in this project to reduce decision-making time necessary to effectively engage ballistic missiles. Again, BMDO leverages off several existing Service-funded theater air defense command center upgrades and this project funds only the specific TMD-related aspects of these upgrades. BMDO's central direction and support of hardware and software developments will produce an integrated C2 capability for TMD.

The joint warfighters and BM/C3I developers evaluate the effects of early warning, improved interoperability, integration, and command center upgrades on joint TBMD doctrine through BM/C3I work shops and analysis.

Project 3261

Page 1 of 4 Pages

Exhibit R-2 (PE 0603864C)

RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603864C Battle Management and C41 for TMD Acquisition	1 for TMD 3261
All of the efforts in the times and allow more other friendly forces.	is project are designed to provide opportunities to efficiently and ef	a seamless interoperable architecture to provide timely warning and information necessary to reduce decision fectively engage hostile missiles. The end result will kill more missiles and will reduce casualties to U.S. and	on necessary to reduce decisio Il reduce casualties to U.S. an
FY 1996 (\$ in Thousands): - \$7,120 Army	.: Complete debris techniqu	les analysis plan and track correlation and flexible firing doctrine analysis; eval	luate software maturity for
- \$1,523	operational tests, develop a data first nationals, establish a software notary and re-use database. Air Force: Start integration of JTIDS on multiple additional USAF platforms; complete initial JTIDS integration on AWACS; produce two additional TMD intelligence support templates; prototype the decision support aids for Joint Force Air Component Commander (JFACC) battle	In nanctions, establish a software notary and re-use databases. IDS on multiple additional USAF platforms; complete initial JTIDS integration on AWACS; produce two not templates; prototype the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision support aids for Joint Force Air Component Commander (JFACC) because the decision of the decision support aids for Joint Force Air Component Commander (JFACC) because the decision of the decision support aids for Joint Force Air Component Commander (JFACC) because the decision of the deci	on AWACS; produce two ent Commander (JFACC) batt
	management; complete gateway software development and testing; multi-sensor tracking algorithm development; implement situation targeting algorithms; develop, simulate, and demonstrate prototypes of the recommended Theater Battle Management Core Systems (TBMCS) application for the distributed C2 nodes; update Information Exchange Requirements (IER) and resolve interoperability issues; produce technical	sting; multi-sensor tracking algorithm developmen the recommended Theater Battle Management Coi .xchange Requirements (IER) and resolve interope	nt; implement situation targeture Systems (TBMCS) erability issues; produce techn
- \$6,885	baseline for Time-Critical Target Aid (TCTA) and JTIDS gateway. Navy: Conduct JTIDS network design analysis; enhance evolution participate in Joint TMD BM/C3I work shops; complete testing of J Maritime Command Information Services (IMCIS) interface: heain	Aid (TCTA) and JTIDS gateway. lesign Maritime Command Information System (JMCIS) TBMD segments; lesign analysis; enhance evolution of Joint Maritime Command Information System (JMCIS) TBMD segments; work shops; complete testing of JTIDS C2P modifications; begin development of ICD for AEGIS/Joint Services (IMCIS) interface; heain implementation of TBMD modifications necessary for Advanced Combat	stem (JMCIS) TBMD segment of ICD for AEGIS/Joint
- \$3,500	Direction system (ACDS). The last two efforts are critical to maintain schedule with AEGIS and ACDS. USMC: Integrate additional JTIDS terminals into Air Defense Communications Platform (ADCP); commence development of cue acceptance and ANTES 50 (HAMP) redarminated integration efforts for ITIDS (TADII). In into the Tactical Air Operations Module (TADM)	naintain schedule with AEGIS and ACDS. Communications Platform (ADCP); commence of the for ITDS (TADII. In the the Tactical Assets	development of cue acceptanc
- \$8,119	Joint/Combined: Conduct TMD BM/C31 work shops; conduct Information Distribution System (MIDS) Army development	BM/C31 work shops; conduct command and control (C2) tests to refine C2 procedures; initiate Multifunctional (MIDS) Army development efforts; complete rapid & contingency deployable prototypes of the Combat	prototypes of the Combat
	integration Capability (CLC) and the Sector Amil-Air warrate racting (SAAWE); conduct inforcing and analysis of 511D3 network structure support of TMD; support inter-Service integration efforts; initiate joint TMD planning capability; develop follow-on TADIL-J messages; test and refine existing messages.	the Sector Anni-An wanate racting (SAAWF), conduct incucting and analysis of FLDS network substities in ervice integration efforts; initiate joint TMD planning capability; develop follow-on TADIL-J messages; test	is of 5 LIDS inclwork surveine w-on TADIL-J messages; test
- \$27,147	Total		
FY 1997 (\$ in Thousands):	:(spug		
0\$	Total		
FY 1998 (\$ in Thousands): - \$0	ands):		
Project 3261	Page 2 of 4 Pages		Exhibit R-2 (PE 0603864C)



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET (R-2 Exhibit)		DATE February 1997	y 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603864C Battl Acquisition	PENUMBER AND TITLE 0603864C Battle Management and C41 for TMD Acquisition	ement and	C41 for TMD	РРОЈЕСТ 3261
- \$0 Total					
FY 1999 (\$ in Thousands):					
- \$0 Total					
Acquisition Strategy: The 3261 Project acquisition strategy leverages existing system acquisition programs (which are subject to milestone decisions and testing) and accomplishes supporting tasks to satisfy BM/C3I performance requirements. A significant portion of this project entails systems engineering of separately funded and managed service programs so that all systems will interoperate when fielded.	ing system acquisit s. A significant po d.	ion programs (whi	ch are subject to t entails systems	milestone decisions ar engineering of separat	id testing) and ely funded and
B. Program Change Summary (\$ in Thousands)					
Previous President's Budget Current Budget Submit/President's Budget	FY 1997 0 0	E <u>Y 1998</u> 0 0	EY 1999 0 0	Total <u>Cost</u> 23,160 27,147	
Change Summary Explanation: Funding: Congressional direction eliminated the TMD BM/C3I program elements 0603864/0604864C and placed this project under the Joint TMD activities Funding: Congressional direction eliminated the TMD BM/C3I program element. Consistent with this direction, a determination was made that this program is more appropriately funded with Dem/Val funds. Navy tasks directly supporting the Navy Area TBMD program were deleted from this project for FY1997 and beyond and funded under the Navy Area TBMD program element (Project 2263) to unify control.	n elements 060386 nade that this progre ect for FY1997 and	4/0604864C and pl m is more appropr beyond and fundec	laced this projec iately funded w d under the Nav	t under the Joint TMD ith Dem/Val funds. Na y Area TBMD program	activities vy tasks directly ı element
Schedule: None					
Technical: None					
Project 3261	Page 3 of 4 Pages		Ш	Exhibit R-2 (PE 0603864C)	64C)

RDT&E BUDGET ITEM J		TA	ION SH	EET (R	UST' ATION SHEET (R-2 Exhibit)	it)		DATE Feb i	February 1997	7.
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUN 0603 Acqu	PE NUMBER AND TITLE 0603864C Battl Acquisition	rte attle Man	agement	and C4	PENUMBER AND TITLE 0603864C Battle Management and C41 for TMD Acquisition	92 32	РRОЈЕСТ 3261
C. Other Program Funding Summary (S in Thousands)	(spues									
While this program is not dependent upon funding from other programs, it supports these programs by providing capstone systems engineering, common BM/C31 guidance, government furnished equipment, interface support, joint network design analysis, and other actions necessary to achieve interoperability among independent systems.	tom other prog e support, join	rams, it sup t network d	ports these gesign analys	programs by is, and othe	y providing o r actions nec	capstone sys	tems engine hieve intero	her programs, it supports these programs by providing capstone systems engineering, common BM/C31 ort, joint network design analysis, and other actions necessary to achieve interoperability among indepe	on BM/C3I ong indepen	dent
3261 TMD BM/C31 PE: 0604864C 3261 TMD BM/C31 PE: 0603872C	EY 1996 1 10,115	F <u>Y 1997</u> 0 32,357	EY 1998 0 34,094	EY 1999 0 35,864	FY 2000 0 43,717	FY 2001 0 44,576	FY 2002 0 43,210	FY 2003 0 43,286	To Compl TBD Comp	Total Cost TBD Comp
D. Schedule Profile										
Data link handbook published (Army) TMD software library & re-use database established (Army) Two CIC/SAAWF prototypes fielded (USAF/USMC)	EY 1996 2 3	4 X X X \	1 2 EX	EY 1997 2 3	4 	EV 1998 2 3	∞\ €.	- 2 F	EY 1999 2 3	4
Project 3261			Page.4 of 4 Pages	Pages			Exhibi	Exhibit R-2 (PE 0603864C)	03864C)	

RDT&E BUDGET ITEM		JUSTIFICATION SHEET (R-2 Exhibit)	TION SI	HEET (R	t-2 Exhi	bit)		DATE Fel	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 0 6 0	PE NUMBER AND TITLE 0603867C Navy Area TBMD	тітге Javy Are	а ТВМD			P 2	PROJECT 2263
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2263 Navy Area TMD	277,565	59,315	0	0	0	0	0	0	TBD	TBD
To see the other Program Elements and Appropriations associated with Navy Area TMD, see section C of this R2. A. Mission Description and Budget Item Justification The Navy Area Theater Ballistic Missile Defense (TBMD) project builds on the national investment in AEGIS ships, weapon systems, and Navy Standard Missile II (SM-2) Block IV missiles. Two classes of ships continue to be deployed with the AEGIS combat system: the CG-47 Ticonderoga-class cruisers and the DDG-51 (SM-2) Block IV missiles. Navy TBMD will take advantage of the attributes of naval forces including overseas presence, mobility, flexibility, and sustainability in order to provide protection to debarkation ports, coastal airfields, amphibious objective areas, Allied forces ashore, and other high value sites. Navy assets will provide an option for initial TBMD allowing the insertion of additional land-based TBMD assets and other expeditionary forces in a threatening environment.	propriations assostification Defense (TBMD) I ships continue to I take advantage of coastal airfields,	clated with project build be deploye of the attribut amphibious	Navy Area Is on the nati d with the A les of naval objective ar TBMD asse	TMD, see so ional investra EGIS combs forces includeas, Allied for ts and other ts and other	ection C of nent in AEG at system: ti ling oversea orces ashore expeditiona	this R2. IIS ships, were the CG-47 Ticks presence, in and other h	apon system conderoga-c nobility, flex igh value sii threatening	s, and Navy lass cruisers ibility, and s ies. Navy ass environmen	s associated with Navy Area TMD, see section C of this R2. MD) project builds on the national investment in AEGIS ships, weapon systems, and Navy Standard Missile II nue to be deployed with the AEGIS combat system: the CG-47 Ticonderoga-class cruisers and the DDG-51 tage of the attributes of naval forces including overseas presence, mobility, flexibility, and sustainability in ordicals, amphibious objective areas, Allied forces ashore, and other high value sites. Navy assets will provide an itional land-based TBMD assets and other expeditionary forces in a threatening environment.	ssile II 51 in order de an
 £Y 1996 (\$\frac{\$}\$ in Thousands): \$266,377 Continue AEGIS Combat System Computer Program design; conduct Tactical Program system concept review (SCR); conduct User Operational Evaluation System (UOES) preliminary design review (PDR); and begin development of system level design specification for Tactical Program. Complete preliminary missile design and PDR. Complete Risk Reduction Flight Demonstration program. Initiate procurement of Engineering Design Model (EDM) test rounds. Continue command and control processor (C2P) development and implementation of TBMD messages in LINK 11 and LINK 16. 	ombat System Cor (UOES) prelimina rry missile design M) test rounds. Co	mputer Progray design re- and PDR. Continue com	ram design; view (PDR); omplete Ris mand and co	conduct Tac and begin d k Reduction ntrol proces	tical Progra levelopment Flight Dem sor (C2P) d	n system cor of system le onstration pr	icept review vel design sj ogram. Initii nd impleme	(SCR); concectification are procured intation of TI	duct User Op for Tactical I nent of Engin BMD messag	crational rogram. scring es in
 \$5,967 Conduct required lethality analyses, lethality model refinements and testing in support of Live Fire Test and Evaluation (LFT&E). \$5,221 Continue building and delivery of targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets. \$277,565 Total 	thality analyses, I	ethality mod gets to suppo	el refinemen ort Navy TBI	its and testin MD flight te	g in support sts. Mainta	ses, lethality model refinements and testing in support of Live Fire Test and Evaluation (LFT& of targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets.	Test and Ev ire to suppo	raluation (LF rt TMD targ	·T&E). ets.	
 EY 1997 (\$\$\$ in Thousand\$\$): So,315 Continue systems engineering and analysis and conduct Milestone II Defense Acquisition Board (DAB). Continue development of UOES and tactical computer programs; initiate development of computer program design specifications for the tactical program. Continue detailed missile design. Continue test planning. Define interface for TBMD-related upgrades to AEGIS and Joint Maritime Command Information System (JMCIS). Continue C2P development. \$59,315 Total 	ngineering and an ograms; initiate d rocurement and fa ing. Define interfa lopment.	alysis and co evelopment o brication of ice for TBMI	nduct Miles of computer EDM test ro D-related up	tone II Defe program de unds. Provi grades to Al	nse Acquisi sign specific de technical 3GIS and Jo	ion Board (Lations for the support for zero int Maritime	AB). Cont: 2 tactical pro AEGIS weag Command I	inue develop bgram. Cont Jons system Information	nd analysis and conduct Milestone II Defense Acquisition Board (DAB). Continue development of UOES a state development of computer program design specifications for the tactical program. Continue detailed mis and fabrication of EDM test rounds. Provide technical support for AEGIS weapons system design activities. Interface for TBMD-related upgrades to AEGIS and Joint Maritime Command Information System (JMCIS).	
Project 2263			Page I of 7 Pages	7 Pages			Exhib	Exhibit R-2 (PE 0603867C))603867C)	

RDT&E BUDGET ITEM JUSTIFICAT	USTIFICATION SHEET (R-2 Exhibit)	2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603867C Navy	PE NUMBER AND TITLE O603867C Navy Area TBMD	PROJECT 2263
FY 1998 (\$ in Thousands): - \$0 No funding in FY 1998 - \$0 Total			
FY 1999 (\$ in Thousands): - \$ No funding in FY 1999 - \$0 Total			
Acquisition Strategy: This strategy consists of a Navy Area TBMD Program evolving to a Theater-Wide Defense TBMD program. The Navy Area Program will build on existing force structure by modifying the SM-2 Block IV missile and AEGIS Combat System to achieve TBMD capability.	am evolving to a Theater \EGIS Combat System to	-Wide Defense TBMD progran achieve TBMD capability.	m. The Navy Area Program will build
B. Program Change Summary (S in Thousands)			
Previous President's Budget Appropriated Value Adjustments to Appropriated Value	EY 1997 60,000 60,000	FY 1998 FY 1999 0 0	Total Cost 247,258
a. PBD 633 Reductions Current Budget Submit/President's Budget	-685 59,315		336,880
Change Summary Explanation: Funding: Delays in the risk reduction flight tests, SM-2 Blk IVA design immaturity, and cost growth in targets necessitated a program restructure and an FY96 notification reprogramming from P.E. 0604867C to 0603867C. Additional risk reduction flight test delays in early FY1997 necessitated a request to reprogram funds from P.E. 0604867C to 0603867C.	ın immaturity, and cost g tional risk reduction fligl	rowth in targets necessitated a	4-2 Blk IVA design immaturity, and cost growth in targets necessitated a program restructure and an FY96 0603867C. Additional risk reduction flight test delays in early FY1997 necessitated a request to reprogram
Schedule: The January 1996 program restructure included a delay in both UOES and FUE dates. The Navy Area TBMD Program, within the FY97 President's Budget, supported an SM-2 Block IVA UOES capability in FY1999 and FUE in FY2001. However, due to concerns with 1996 flight test delays, and to allow a longer test period to accommodate a more conservative Developmental Testing/Operational Testing schedule, UOES is projected for FY2000 and FUE in FY2002. Following an independent life cycle cost estimate of the rebaselined program and successful completion of the Milestone II DAB, these schedules will be reassessed.	ooth UOES and FUE date and FUE in FY2001. Ho al Testing/Operational Te rogram and successful or	ss. The Navy Area TBMD Prowever, due to concerns with 1 sting schedule, UOES is proje ompletion of the Milestone II I	ogram, within the FY97 President's 996 flight test delays, and to allow a seted for FY2000 and FUE in FY2002. JAB, these schedules will be
Technical: Additional lethality analysis and testing have been include	d in the program as a res	have been included in the program as a result of the January 1996 restructure.	ture.
Project 2263	Page. 2 of 7 Pages	Ú	Exhibit R-2 (PE 0603867C)

RDT&E BUDGET ITEM	דו	LIFICAT	USTIFICATION SHEET (R-2 Exhibit)	EET (R	-2 Exhit	oit)		DATE Feb	February 1997	2
BUDGET ACTIVITY 4 - Demonstration and Validation	tion		PE NUI 060	PE NUMBER AND TITLE 0603867C Navy	D TITLE Navy Area TBMD	TBMD			PR(РРОЈЕСТ 2263
C. Other Program Funding Summary (\$ in Thousands)	(\$ in Thousands)									
Navy Area TMD (EMD) P.E., 0604867C Standard Missile WPN 1507, BA2 * Funds transferred to U. S. Navy	FY 1996 0 16,276	FY 1997 241,330 9,151	EY 1998 267,822 *15,500	FY 1999 227,800 *44,600	EY 2000 222,145 *130,000	EY 2001 158,271 *161,000	FY 2002 52,433 *236,000	EY 2003 38,089 *225,000	To Compl Cont. *Cont.	Total Cost Cont *Cont
D. Schedule Profile										
	FY 1996	4	1 EX	EY 1997 2 3	4	FY 1998 2 3	38 3 4	-	FY 1999 2 3	4
Acquisition Milestones: - Acquisition Milestone II			×							
Engineering Milestones: - AEGIS Combat System (ACS) Preliminary Design Review(PDR)(UOES) - SM-2 BLK IVA PDR - ACS Systems Design Review (Tactical) - SM-2 BLK IVA Critical Design Review - ACS PDR (Tactical)	*	*	× ′ ∗	×						
T&E Milestones - White Sands Missile Range NM (DT/Operational Assessment)								,	×	
- UOES - LRIP - Navy Area TBMD TECHEVAL (DT) - Navy Area TBMD OPEVAL - Acquisition Milestone III	4thQFY00 2ndQFY01 2ndQFY01 4thQFY01 2ndQFY02 3rdQFY02									
Project 2263			Page 3 of 7 Pages	Pages			Exhibi	Exhibit R-2 (PE 0603867C)	603867C)	

RDT&E	PROGR	AM ELE	MENT/P	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COSTE	REAKDO	JWN (R-	3	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	and Valid	ation			PE NUMBER AND 0603867C	PE NUMBER AND TITLE 0603867C Navy	ЭТІТLЕ Navy Area TBMD	Q		PF 2.	РRОЈЕСТ 2263
A. Project Cost Breakdown (\$ in Thousands)	vn (S in The	usands)									
				FY 1996		FY 1997	FY 1998	FY 1999			
a. Program Management/Integration	itegration			6,085		1,300	0	0			
b. System Engineering)			40,318	~	6,700	0	0			
				4,933	m (200	0	0			
d. Program Support e. Shin System Modifications	Suc			4.300		90	0	0			
				57,675	. 10	5,800	0	0	_		
g. Hardware Fab. and Proc.	.:			71,268		38,015	0	0	_		
				8,600	0	0	0	0	_		
				5,221		0	0	0	_		
j. Engineering Support				5,500	0	0 (0	0 (
k. Travel	The forter			200		1 300	> C				
I. Developmental Test and Evaluation	Evaluation			10,000		1,500	-				
m. Operational Test and Evaluation	valuation			1 300		0	0				
n. Other/Miscellaneous				1,500	- v	000			o c		
o. Sortware Development Total				277,565		59,315	>	,			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	story and P	lanning Info	rmation (\$ i	n Thousands)							
Performing Organizations:	:s										
Contractor or Contract Government Method/Ty Performing or Funding Activity Vehicle	e d	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	nizations										
Droject 2263				Po	Page 4 of 7 Pages	Sec		П Х	Exhibit R-3 (PF 0603867C)	06038670)	
rioject 2203					2 / 6 / 59	200			101111	000000	



R	RDT&E PROGRAM ELEMENT/PROJECT	SRAM EL	EMENT/F	ROJECT	COST BREAKDOWN (R-3)	REAKD	JWN (R-	3)	DATE F (February 1997	766
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Va	lidation			PE NUMBER AND TITLE 0603867C Navy	C Navy	PE NUMBER AND TITLE 0603867C Navy Area TBMD	۵			РКОЈЕСТ 2263
Contractor or	Contract Method/Tvne	Award or	Performing	Project	Total						
Performing	or Funding	Obligation	Activity	Office	Prior to	Budget	Budget	Budget	Budget	Budget to	Total
Activity	Vehicle	Date	EAC	EAC	FY 1996	FY 1996	FY 1997	FY 1998	FY 1999	Complete	Program
Standard Missile	CPAF				0	121,709	19,815	0	0	TBD	141,524
Co.	17 40				30 407	25 001	0 200	c	C	TRD	83 608
NSWC Dahlaren	CFAF WR				14.405	19,689	7,515	0	0	OET COET	41,609
JHU/APL	PD				30,928	21,456	2,570	0	0	TBD	54,954
Holloman AFB	MIPR				2,140	1,400	0	0	0	TBD	3,540
Motorola	CPFF				6,162	12,728	5,985	0	0	TBD	24,875
SPAWAR	PD				0	633	750	0	0	TBD	1,383
Hughes	CPAF				86,568	8,130	0	0	0	TBD	94,698
Raytheon	CPAF				51,966	4,210	0	0	0	TBD	56,176
Arnold Eng.	CPFF				0	1,400	0	0	0	TBD	1,400
ARC	CPFF				0	3,400	0	0	0	TBD	3,400
Kaman	CPFF				0	1,700	800	0	0	TBD	2,500
Miscellaneous				•	9,718	1,810	580	0	0	TBD	12,108
(efforts < \$500K)											
Support and Management Organizations	gement Organizat	ions						,	,	!	
NSWC Dahlgren	WR				3,813	8,891	3,115	0	0	TBD	15,819
NSWC Port	WR				220	368	0	0	0	TBD	288
Hueneme NAWC China	WR				0	2,354	780	0	0	TBD	3,134
Lake											
NSWC Indian	RCP				0	1,543	655	0	0	TBD	2,198
Head	CPER				3 500	2 400	200	-	C	TRD	6.400
VIIKO	Crrr				٠	747	200	· c	· c	TRD	1 242
JEC	CFFF				0	3.973	006	0	0	TBD	4,873
Hanscomb AFB	MIPR				0	1,500	750	0	0	TBD	2,250
(MIT/LL)											
Project 2263				ď	Page 5 of 7 Pages	es		ПX	Exhibit R-3 (PE 0603867C)	0603867C)	
110/00/ 2200											

RD.	RDT&E PROGRAM ELEMEI	SRAM EL		NTPROJECT	COST BI	REAKDO	COST BREAKDOWN (R-3)	3)	DATE	February 1997	16
BUDGET ACTIVITY 4 - Demonstration and Validation	ition and Va	lidation	Š		PE NUMBER AND TITLE 0603867C Navy	AND TITLE C Navy	PE NUMBER AND TITLE 0603867C Navy Area TBMD				РРОЈЕСТ 2263
Contractor or Government Performing Activity Miscellaneous (efforts < \$500K)	Contract Method/Type or Funding <u>Vehicle</u>	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to EY 1996 6,022	Budget FY 1996 2,657	Budget E <u>Y 1997</u> 1,500	Budget FY 1998 0	Budget FY 1999 0	Budget to <u>Complete</u> TBD	Total Program 10,179
Test and Evaluation Organizations NAWC Point WR Mugu NSWC Port WR	LOrganizations WR				5,018	1,391	475	0 0	0 0	TBD	6,884
NSWC Port Hueneme NSWC Dahlgren JHU/APL SSDC Army WSMR PMRF NWAD Corona Miscellaneous (efforts < \$500K)	WR WR WIPR WR WR				5,800 0 7,534 3,250 0 12,628	250 330 1,483 5,221 5,581 2,865 1,000 1,660	100 200 500 0 1,525 350 250	000000	0 000000	OET COET COET COET COET	1,230 6,330 1,983 12,755 10,356 3,215 1,250 14,288
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands) Government Furnished Property: Contract Method/Type Award or Item or Funding Obligation Delivery Description Vehicle Date Prior FY 195 Product Development Property.	ition History and ished Property: Contract Method/Type or Funding Vehicle ant Property.	d Planning Inf Award or Obligation Date	ormation Con Delivery Date	tinued (S in Th	Cousands) Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total
Support and Management Property Project 2263	ement Property		:	Pa	Page 6 of 7 Pages	s		Exh	Exhibit R-3 (PE 0603867C)	0603867C)	

RD	T&E PROG	RAM ELI	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BE	REAKDO	WN (R-3		DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Val	idation		PE NUMBER AND TITLE 0603867C Navy	AND TITLE	DE NUMBER AND TITLE O603867C Navy Area TBMD			P 2	РРОЈЕСТ 2263
Item <u>Description</u>	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Dafe</u>	Delivery Date	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Test and Evaluation Property	a Property									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	evelopment nd Management 3valuation			241,294 13,555 35,110	233,356 24,428 19,781	47,215 8,700 3,400				521,865 46,683 58,291
Total Project				289,959	277,565	59,315				626,839
·										
Project 2263			P.	Page 7 of 7 Pages	Sz		Exh	ibit R-3 (PE	Exhibit R-3 (PE 0603867C)	

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RDT&E BUDGET ITEM	EM JUS	TIFICA	TION S	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhi	bit)		DATE Fel	February 1997	76
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603868C Navy Theater Wide TMD	гіт∟Е lavy The≀	ater Wide	TMD			РВОЈЕСТ 1266
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1266 Navy Theater Wide Missile Defense	200,442	304,171	194,898	192,073	191,229	190,930	145,190	149,444	Continuing	Continuing
A. Mission Description and Budget Item Justification The Navy Theater Wide (NTW) Ballistic Missile Defense (BMD) program builds upon the Navy Area Theater Missile Defense (TMD) program and the national investment in AEGIS ships, weapons systems, and missiles. Two classes of ships are deployed with the AEGIS combat system: the Ticonderoga Class cruisers and the Arleigh Burke Class destroyers. Navy Theater Wide BMD will take advantage key naval forces attributes including overseas presence, mobility, flexibility, and sustainability to provide protection of a theater of operations.	ation ile Defense (I and missiles. Wide BMD	3MD) progr Two classe will take adus.	am builds uj ss of ships ar vantage key	pon the Navy e deployed v naval forces	/ Area Theat vith the AEC attributes in	ter Missile D 31S combat s cluding over	efense (TM system: the S	D) program : Ficonderoga ce, mobility,	and the natic Class cruise flexibility,	onal rs and the md
The Navy Theater Wide BMD program will provide an exo-atmospheric naval regional defense capability to counter the TBM threat. In accordance with the BMD Program Review in early 1996, the Navy Theater Wide program is conducting the following activities: an AEGIS LEAP system level intercept demonstration, Kinetic Warhead (KW) technology assessments and concept definition studies, and system engineering efforts to identify key technical risk reduction activities including discrimination and KW lethality. Since the FY97 President's Budget request, the Department has provided additional funds for FY 98-01 to increase testing and conduct more in-depth risk reduction. Ongoing advanced technology studies provide the anticipated objective system improvements required to meet the evolving threat. This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy.	ovide an exo ter Wide pro nncept definit 97 President g advanced te and Program	-atmospheri gram is cond ion studies, 's Budget re chnology st	c naval regic lucting the fi and system of quest, the Di udies provid des as identi	n exo-atmospheric naval regional defense capability to counter the TBM threat. In accordance with the B e program is conducting the following activities: an AEGIS LEAP system level intercept demonstration, efinition studies, and system engineering efforts to identify key technical risk reduction activities includin ident's Budget request, the Department has provided additional funds for FY 98-01 to increase testing anced technology studies provide the anticipated objective system improvements required to meet the evolvegram Element codes as identified in this descriptive summary in accordance with existing Department of	capability to vities: an A stforts to ide is provided a ated objective corrigities or	counter the EGIS LEAP ntify key tec the inditional fur ve system im ummary in actionary in actional in	TBM threal system levelunical risk inds for FY 5 provements	In accorda el intercept deduction act 8-01 to incr required to rith existing	nce with the lemonstratio ivities inclu- ease testing meet the ev-	BMD n, Kinetic ling and living of
 EY 1996 (\$ in Thousands): Sontinued NTW TBMD planning and studies, and continue Navy Cost and Operational Effectiveness Analysis (COEA) Phase II. Conducted system and design engineering to support the guidance-to-hit (GTH) technical demonstration flights including SM-2/LEAP limited integration. Conducted AEGIS Weapon System (AWS) integration for an NTW interceptor and provide limited AWS integration to support the GTH demonstration flights. Provided technical support and historical expertise for NTW program. \$15,972 Provided follow-on engineering and analysis to conduct system engineering and risk reduction activities. \$5,000 Conducted initial lethality tests for momentum/weight effects. \$3,500 Conducted initial lethality tests for momentum/weight effects. 	planning and eering to suppon System (1 out and historing and a texploration y tests for me	studies, and oort the guid (WS) integral expertise analysis to control analysis under the analysis under the control of the co	l continue Nance-to-hit (ation for an for NTW panduct system for the Joint sight effects.	ng and studies, and continue Navy Cost and Operational Effectiveness Analysis (COEA) Phase II. Conducted o support the guidance-to-hit (GTH) technical demonstration flights including SM-2/LEAP limited integration tem (AWS) integration for an NTW interceptor and provide limited AWS integration to support the GTH nistorical expertise for NTW program. and analysis to conduct system engineering and risk reduction activities. ration analysis under the Joint System Engineering interceptor studies. for momentum/weight effects.	1 Operationa ical demons eptor and program and program in teken g and risk re ineering inte	ul Effectivene tration flight ovide limited eduction activereceptor studi	ess Analysis s including I AWS integ vities. ies.	(COEA) Ph SM-2/LEAP ration to sup	ase II. Condimited inte	
Project 1266			Page 1 of 7 Pages	7 Pages			Exhib	Exhibit R-2 (PE 0603868C))603868C)	

RE	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	n and Validation 0603868C Navy Theater Wide TMD	PROJECT 1266
FY 1997 (\$ in Thousands) - \$170,200 Con(<u>sands):</u> Continue Vertical Launch System (VLS) integration of the technical demonstration interceptor. Continue engineering for the NTW regional	gineering for the NTW regional
- \$80.100	defense program and continue specific concept investigations and technology demonstrations. Conduct kill vehicle technology assessments and shinboard system risk reduction activities.	
- \$25,450	Continue NTW TBMD planning and studies, and complete Navy COEA Phase II.	
- \$24,000	Continue AEGIS Weapon System integration for an NTW interceptor and provide limited AWS integration to support the GTH demonstration	o support the GTH demonstration
- \$4,421	ilights. Continuc follow-on engineering and analysis to support NTW.	
- \$304,171	Total	
FY 1998 (\$ in Thousands):	sands):	
- \$119,000	Continue planning and system engineering in support of the end game GTH demonstration flights. Continue VLS integration the technical	VLS integration of the technical
- \$35.542	demonstration interceptor. Conduct kill vehicle fechnology assessments and shinhoard system risk reduction activities	
	Continue NTW TBMD planning and studies.	
- \$19,377	Continue AEGIS Weapon System integration for an NTW interceptor and provide limited AWS integration to support the end game	o support the end game
•	demonstration flights.	
- \$1,431 - \$194,898	Continue Iollow-on engineering and analysis to support N I W. Total	
FY 1999 (\$ in Thousands):	rsands):	
- \$113,000	Continue planning and system engineering in support of the end game GTH demonstration flights. Continue VLS integration of the technical	VLS integration of the technical
	demonstration interceptor.	
- 341,3/3	Conduct Kill Venicle technology assessments and shipboard system risk reduction activities.	
- \$17,951	Continue N I W. I DAMP plaining and studies. Continue AEGIS Weapon System integration for an NTW intercentor and provide limited AWS integration to support the end came GTH	o sunnort the end asme GTH
	demonstration flights.	
ده	Total	
Acquisition Strategy: T	Acquisition Strategy: The Navy acquisition strategy is to leverage the AEGIS ship anti-air warfare capability development by integrating TBMD capability through the	ng TBMD capability through the
Standard Missile prime contractor.	contractor.	•
Project 1266	Page 2 of 7 Pages	Exhibit R-2 (PE 0603868C)

RDT&E BUDGET ITEM	A JUSTIFICATION SHEET (R-2 Exhibit)	TION SH	EET (R-	2 Exhib	it)		DATE Febi	February 1997	7
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUN 0603	PE NUMBER AND TITLE 0603868C Navy Theater Wide TMD	TLE avy Thea	ter Wide	TMD		PR(12	рвојест 1266
B. Program Change Summary (\$ in Thousands)							Total		
Previous President's Budget	EY 1996 194,565	됴 ~	58,171 304 171	FY 1998 96,226	<u>FY 1999</u> 143,295		Cost 492,257		
Changes to Appropriated Value: a. Restoration of Inflation Reduction Current Budget Submit/President's Budget	5,877 200,442		304,171	194,898	192,073		891,584		
Change Summary Explanation: Funding: FY1997 change due to Congressional ad	il addition of \$246M and various adjustments to the program. Changes in FY97 - 99 reflect congressional language	and various ac	Jjustments to	o the progran	n. Changes	in FY97 - 9	9 reflect cong	gressional lan	Iguage
and DoD increases to the program. Schedule: The Navy SM-2/AEGIS/LEAP program was delayed 3-6 months in FY96 in order to transition the executing agent from the BMDO to the Navy; Completion of Navy TBMD COEA has been delayed approximately one year following program restructure in January 1996. The joint system engineering team (JSET) study will be completed in the third quarter of FY98 with a briefing to be presented in the fourth quarter FY98. Technical: None	ram was delayed 3-6 months in FY96 in order to transition the executing agent from the BMDO to the Navy; clayed approximately one year following program restructure in January 1996. The joint system engineering arter of FY98 with a briefing to be presented in the fourth quarter FY98.	months in FY / one year foll oriefing to be j	96 in order (owing progr presented in	to transition am restruct the fourth q	the executi ne in Janua uarter FY98	ng agent fro ry 1996. Th i.	m the BMDO e joint system	to the Navy. cngineering	team
C. Other Program Funding Summary (\$ in Thousands)	(spu	,						<u>r</u>	Total
	EY 1996 FY 1997 277,565 59,315	FY 1998 0 267 822	EY 1999 0	FY 2000 0 222 145	EY 2001 0 158.271	FY 2002 0 52,433	FY 2003 0 38.089	Compl TBD Cont	TBD Cont
2263, Navy Area 11BMD, FE 0004507 C. Standard Missile WPN 1507, BA2 * Funds transferred to U. S. Navy		*15,500	*44,600	*130,000	*161,000	*236,000	*225,000	*Cont	*Cont
D. Schedule Profile	FY 1996 2 3 4	1 EX	F <u>Y 1997</u> 2 3	4	FY 1998 2 3	3 3 4	1 2	FY 1999 2 3	4
Transition to Navy as Executing Agent Control Test Vehicle 1 Complete Navy TBMD COEA Third Stage Rocket Motor Test Control Test Vehicle 2 Kinetic Warhead Hover Test				×××		××			
Project 1266		Page 3 of 7 Pages	Pages .			Exhibi	Exhibit R-2 (PE 0603868C)	03868C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603868C Navy Theater Wide TMD	PROJECT 1266
Complete Joint System Engineering Study Control Test Vehicle 3 Control Test Vehicle 4 First Flight Intercept Demo 1 (Guidance Test Vehicle) - 2Q/FY2000	FY 1997 2 3 4 1 2 3	4 1 2 3 X X X X X X X X X X X X X X X X X X
Project 1266	Page 4 of 7 Pages	Exhibit R-2 (PE 0603868C)

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RD	RDT&E PROC	SRAM EL	EMENT/P	PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST B	REAKDO	JWN (R-	8	DATE Fe	February 1997	76
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation			PE NUMBER AND TITLE 0603868C Navy	AND TITLE	PE NUMBER AND TITLE 0603868C Navy Theater Wide TMD	ide TMD		PF	РВОЈЕСТ 1266
A. Project Cost Breakdown (\$ in Thousands)	eakdown (S in	[housands]									
				FY 1996		FY 1997	FY 1998	FY 1999			
a. System Engineering	ing			27,099		65,675	37,621	34,727			
b. Program Management	ment			3,818		6,250	5,818	5,818			
c. Program Support				4,386		5,825	5,386	5,386			
d. Ship System Mods	ds			290		8,450	3,875	3,8/5			
e. Design & Analysis	ilS Drocittement			51,340		6,575	58.430	60.499			
	Tiocurcing			5,806		006,6	7,806	7,806			
h. Test Equipment	ł			544		4,600	3,300	3,300			
	oort			3,975		7,500	6,975	6,975			
				300		300	300	300			
k. Software Development	pment			13,795		19,250	18,795	18,795			
1. Other/Misc/BMDO	. O			20,388		4,421	1,475	1,475			
Total				200,442		304,171	194,898	192,073			
B. Budget Acquisition History and Planning Informat	tion History an	l Planning Inf	ormation (S i	tion (S in Thousands)							
Performing Organizations:	izations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations Standard Missile CPAF	nt Organizations CPAF				53,131	84,970	173,750	89,754	89,823	TBD	491,428
Company Lockheed Martin NSWC Dalgren	CPAF WR				12,637 6,109	16,800 20,239	30,575 30,100	16,800	16,800 10,034	TBD	93,612 78,259
Project 1266				Pa	Page 5 of 7 Pages	es		Exhi	Exhibit R-3 (PE 0603868C)	0603868C)	-

RD	RDT&E PROGRAM ELEMENT/PROJECT	GRAM EL	EMENT/P	ROJECT	COST B	REAKD(COST BREAKDOWN (R-3)	3)	DATE	Fahrijany 1007	26
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Va	lidation			PE NUMBER ANI 0603868C	PE NUMBER AND TITLE 0603868C Navy	D TITLE Navy Theater Wide TMD	/ide TMD			PROJECT
Contractor or	Contract										
Government	Method/Type	Award or	Performing	Project	Total						
Performing	or Funding	Obligation	Activity	Office	Prior to	Budget	Budget	Budget	Budget	Budget to	Total
Activity	Vehicle	Date	EAC	EAC	FY 1996	FY 1996	FY 1997	FY 1998	FY 1999	Complete	Program
JHU/APL	RCP				3,295	9,673	18,650	7.807	6.656	TBD	46 081
Holloman AFB	MIPR				8,794	720	1,350	720	720	TBD	12,304
SSI	CPFF				1,576	952	1,500	952	952	TRD	5 932
United Defense	PD				0	2,675	4,100	2.675	2.675	TRD	200,0
Rockwell	CPAF				0	942	1,450	942	942	TRD	4 276
Arnold Eng	CPFF				0	300	400	300	300	TBD	1 300
ARC	CPFF				0	435	200	435	435	Tie	1,805
TSC	CPFF				0	2,150	2,550	2,150	2,150	TBD	000.6
Misc					12,640	2,663	3,750	2,663	2,663	TBD	24.379
BMDO					47,990	37,972	4,421	37,972	37,972	TBD	166,327
Support and Management Organizations	gement Organizat	tions									
NSWC Dalgren	WR				0	2,000	3.100	2.000	2,000	TRD	0 100
NSWC Port	WR				0	815	1,250	815	815	TBD	3,695
Hueneme											
NAWC China Lake	WR				0	1,400	1,675	1,400	1,400	TBD	5,875
NSWC Indian	RCP				0	2.370	2.600	2 370	7 370	Tan	0.710
Head									2,77	TOD	9,710
VITRO	CPFF				2,132	445	550	445	445	TRD	4 017
SPA	CPFF				0	500	1.000	200	2005	TRD	2,500
JHU/APL	CPFF				0	4,153	5,500	4.153	4 153	TRD	17.050
Misc					2,589	1,496	1,900	1,496	1,496	TBD	8,977
Test and Evaluation Organizations	1 Organizations										
NSWC Daloren	WR				c	0000	7	0	•	:	
JHI I/A PI	CPFF				> <	3,800	4,600	3,800	3,800	TBD	16,000
SSDC Army	MIPR				0	400	1,500	400	400	TBD	2,700
WSMR	WR				1 198	50	1,600	1,2/6	1,276	TBD	8,428
	1				1,100		1,500	00	20	TBD	2,848
Project 1266				Pa	Page 6 of 7 Pages	Si		Exhi	Exhibit R-3 (PE 0603868C)	0603868C)	
										122222	

RDT&	E PROG	RDT&E PROGRAM ELEMEN	EMENT/PROJECT COST BREAKDOWN (R-3)	COST BR	EAKDO	WN (R-3		DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ו and Val	idation		PE NUMBER AND TITLE 0603868C Navy	AND TITLE	PE NUMBER AND TITLE 0603868C Navy Theater Wide TMD	de TMD		Ξ ←	PROJECT 1266
Misc				3,909	1,246	1,300	1,246	1,246	TBD	8,947
B. Budget Acquisition	History and	Planning Inf	B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	iousands)						
Government Furnished Property:	Property:									
Co Me Item or Description Ve	Contract Method/Type or Funding <u>Vehicle</u>	Award or Obligation <u>Date</u>	Delivery <u>Date</u>	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property	operty									
Support and Management Property	ıt Property									-
Test and Evaluation Property	perty		•							
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	pment magement ıtion			146,172 4,721 5,107	180,491 13,179 6,772	273,096 17,575 13,500	174,947 13,179 6,772	172,122 13,179 6,772		946,828 61,833 38,923
Total Project				156,000	200,442	304,171	194,898	192,073		1,047,584
Project 1266			Pa	Page 7 of 7 Pages	5		Exhi	Exhibit R-3 (PE 0603868C)	0603868C)	

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RDT&E BUDGET ITEM	EM JUS	TIFICA.	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	oit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NU 060 Def	PE NUMBER AND TITLE 0603869C CORPS SAM/Medium Extended Air Defense System - TMD	ORPS S.	AM/Medi ID	um Exter	ıded Air	<u>q</u> ←	РРОЈЕСТ 1262
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1262 CORPS SAM/MEADS Concepts	20,123	56,232	47,956	9,509	0	0	0	0	TBD	ТВD

A. Mission Description and Budget Item Justification

The CORPS SAM/Medium Extended Air Defense System (MEADS) is an advanced air and missile defense system. CORPS SAM/MEADS is designed to fill a critical void providing highly mobile defense of maneuver forces from ballistic and cruise missiles and unmanned aerial vehicles (UAVs). In May 1996 the Memorandum of SAM/MEADS National Product Office has also been established and will be responsible for planning, budgeting, and coordinating all U.S. national efforts in support Understanding (MOU) among the U.S., Germany, and Italy was signed. Subsequently, in June 1996, the Charter for the North Atlantic Treaty Organization (NATO) NATO MEADS Management Agency (NAMEADSMA) is responsible for the accomplishment of the Project Definition-Validation Phase (PD-V). The objective of the PD-V Phase is 1) to define and validate through engineering analyses, simulations and demonstrations a MEADS which is compliant with the commonly agreed cooperative Program to develop, produce in single source and support MEADS which has acceptable technical and financial risks for the Participants. The CORPS MEADS Design and Development, Production, and Logistics Management Organization (NAMEADSMO) was approved. In accordance with these directives, the requirements of the Participants while taking maximum advantage of the technology existing in the countries of the Participants and 2) to define a balanced of the MEADS program as well as executing national specific tasks related to satisfying the CORPS SAM requirements.

deployment for early entry operations with as few as six C-141 sorties; 3) mobility to move rapidly and protect maneuver force assets during offensive operations; 4) a The CORPS SAM/MEADS mission and consequently its design is a function of the assets that CORPS SAM/MEADS must protect, the threat against these assets, and increase in firepower while greatly reducing manpower and logistics requirements. Given these characteristics, CORPS SAM/MEADS will be able to rapidly respond the depth and nature of the battlefield. CORPS SAM/MEADS will be designed to deal with shorter range Tactical Ballistic Missiles (TBMs), cruise missiles, UAVs, and other air breathing threats. It will be required to protect critical maneuver force assets throughout all phases of tactical operations and it will be operating in the distributed architecture and modular components to increase survivability and flexibility of employment in a number of operational configurations; 5) a significant division area of the battlefield outside the umbrella of an upper tier system. CORPS SAM/MEADS will be designed to provide: 1) defense against multiple and simultaneous attacks by Short Range Ballistic Missiles (SRBMs), low cross-section cruise missiles, and other air-breathing threats to the force; 2) immediate to a variety of crisis situations and satisfy the needs of the joint operational and tactical commanders.

FY 1996 (\$ in Thousands):

Conducted International Teaming.	Awarded prime contracts to initiate PD-V Pha	
\$9,605	\$5,600	
1	ı	

Support contracts to provide technical analysis and tools in specialty areas (e.g. lethality, BM/C41, system simulations, FAAD/CORPS SAM/MEADS integration) \$400 1 1

Project 1262

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Page 1 of 7 Pages

Exhibit R-2 (PE 0603869C)

	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603869C CORPS SAM/Medium Extended Air Defense System - TMD	PROJECT 1262
- \$1,530 - \$2,988 - \$20.123	Overall management/support to execute the cooperative program in accordance with the NATO Charter and MOU for PD-V (includes travel and other administrative expenses). CORPS SAM/MEADS National Product Office management/support (including contracts) to conduct assigned tasks in support of and directly related to both national and MEADS international efforts (e.g. user coordination, national oversight and review activities, technology transfer, and technology assessment efforts; threat/scenario, modeling/simulation, cost estimating, Cost and Operational Effectiveness Analysis (COEA), etc.). Includes all U.S. personnel salaries and benefits.	nd MOU for PD-V (includes travel and signed tasks in support of and directly sview activities, technology transfer, ional Effectiveness Analysis (COEA),
J	sands): Prime contracts for PD-V Phase. Support contracts to provide technical analysis and tools in specialty areas (e.g. Icthality, BM/C4I, system simulations, FAAD/CORPS	simulations, FAAD/CORPS
- \$1,378 - \$4,864	SAM/MEADS integration) and support in conducting independent evaluations of contractor trades and analysis. Overall management and administrative support to execute the cooperative program in accordance with the NATO Charter and MOU for PD-V (includes travel and other administrative expenses). CORPS SAM/MEADS National Product Office management/support (including contracts) to conduct assigned tasks in support of and directly related to both national and MEADS international efforts (e.g. user coordination, national oversight and review activities, technology transfer, and technology assessment efforts; threat/scenario, modeling/simulation, cost estimating, COEA, etc.). Includes all U.S. personnel salaries and	ialysis. The NATO Charter and MOU for signed tasks in support of and directly eview activities, technology transfer, icludes all U.S. personnel salaries and
- \$56,232	benefits. Total	
FY 1998 (\$ in Thousands): - \$36,660 Prime - \$6,380 Suppo SAM analy - \$1,392 Overs PD-V - \$3,524 CORI relate and to benef	Prime contracts for PD-V Phase. Support contracts for PD-V Phase. Support contracts to provide technical analysis and tools in specialty areas (e.g. lethality, BM/C4I, system simulations, FAAD/CORPS SAM/MEADS integration), support in conducting independent evaluations of contractor trades and analysis, and provide additional technical analysis of contractor competitive proposals for design and development (D&D). Overall management and administrative expenses) analysis of contractor with the NATO Charter and MOU for PD-V (includes travel and other administrative expenses). CORPS SAM/MEADS National Product Office management/support (including contracts) to conduct assigned tasks in support of and directly related to both national and MEADS international efforts (e.g. user coordination, national oversight and review activities, technology transfer, and technology assessment efforts; threat/scenario, modeling/simulation, cost estimating, COEA, etc.). Includes all U.S. personnel salaries and benefits. Total	is simulations, FAAD/CORPS sis, and provide additional technical te NATO Charter and MOU for igned tasks in support of and directly eview activities, technology transfer, icludes all U.S. personnel salaries and
Project 1262	Page 2 of 7 Pages	Exhibit R-2 (PE 0603869C)



RDT	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	t) DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation		PROJECT 0603869C CORPS SAM/Medium Extended Air 1262 Defense System - TMD
EY 1999 (\$ in Thousands): - \$8,670 Prim - \$300 Supp SAM analy - \$200 Over PD-V - \$339 COR relate and t benef - \$9,509 Total	Prime contractors complete PD-V Phase. Support contractors complete PD-V Phase. Support contracts to provide technical analysis and tools in specialty areas (e.g. lethality, BMC4I, system simulations, FAAD/CORPS SAM/MEADS integration), support in conducting independent evaluations of contractor trades and analysis, and provide additional technical analysis of contractors competitive proposals for D&D. Overall management and administrative expenses). CORPS SAM/MEADS National Product Office management/support (including contracts) to conduct assigned tasks in support of and directly related to both national and MEADS international efforts (e.g. user coordination, national oversight and review activities, technology transfer, and technology assessment efforts; threat/scenario, modeling/simulation, cost estimating, COEA, etc.). Includes all U.S. personnel salaries and benefits. Total	BMC4I, system simulations, FAAD/CORPS trades and analysis, and provide additional technical cordance with the NATO Charter and MOU for s) to conduct assigned tasks in support of and directly loversight and review activities, technology transfer, COEA, etc.). Includes all U.S. personnel salaries and
At this time MEADS is competitive transatlant to meet the requiremen Inc. and H&R Compan team was paired with a DASA, and Siemens. (international teams were based upon the Internal engineering design trad assessment/abatement) technical issues for the compete for selection a pursuing integration of developments that can a development of the compete for selection of developments that can a compete for selection of developments that can a compete for selection of developments that can a compete for selection a pursuing integration of developments that can a compete for selection and developments that can a compete for selection and selection	At this time MEADS is accepted as the acquisition strategy to meet the Arrny CORPS SAM requirement. The acquisition strategy was developed based on having two competitive transatlantic industrial teams conduct the PD-V phase in which technology among the nations would be leveraged to define the most cost-effective solution to meet the requirements. In Oct 95, following a formal U.S. source selection process, the U.S. Army announced the selection of Lockheed-Martin Integrated Systems, here are many the goal of creating two equal transatlantic industrial participants. Following a random selection process, each farem was paired with a European team with the goal of creating two equal transatlantic industrial entities. Both European teams consist of the following firms: Aleini, DASA, and Siemens. Contracts to conduct a four month international industrial entities. Both European teams consist of the following firms: Aleini, DASA, and Siemens. Contracts to conduct a four month international industrial teaming phase were awarded on 1 May 96. Following the teaming phase, the international Technical Requirements Document; conduct requirements analysis/flowdown; establish baseline system concept; conduct concurrent engineering design trades; perform simulations/modeling; provide life cycle cost estimates, and establish integrated program plans to include a risk associated with integrated system performance and resolution of key technical issues for the proposed system design concept through use of end-to-end digital simulation. Also, during the PD-V phase the two international entities will evel compete for selection as the sole contractor to conduct the Design and Development and Production phases. The CORPS SAM/MEADS National Product Office is pursuing integration of CORPS SAM BM/C4I with the Project Manager, Air Defense Command and Control Systems (ADCCS), to take advantage of previous Army developments that can be incorporated into the MEADS program.	tregy to meet the Army CORPS SAM requirement. The acquisition strategy was developed based on having two PD-V phase in which technology among the nations would be leveraged to define the most cost-effective solution al U.S. source selection process, the U.S. Army announced the selection of Lockheed-Martin Integrated Systems, as Aircraft and Raytheon Company) as U.S. industrial participants. Following a random selection process, each for freating two equal transatlantic industrial entities. Both European teams consist of the following firms: Alenia, the international industrial teaming phase were awarded on 1 May 96. Following the teaming phase, the Document, conduct requirements analysis/flowdown; establish baseline system concept; conduct concurrent ing; provide life cycle cost estimates; and establish integrated program plans to include a risk le demonstration of critical functions associated with integrated system performance and resolution of key at through use of end-to-end digital simulation. Also, during the PD-V phase the two international entities will the Design and Development and Production phases. The CORPS SAM/MEADS National Product Office is a Project Manager, Air Defense Command and Control Systems (ADCCS), to take advantage of previous Army S program.
Project 1262	Page 3 of 7 Pages	Exhibit R-2 (PE 0603869C)

RDT&E BUDGET ITEM JUST	USTIFICATION SHEET (R-2 Exhibit)	SHEET (F	8-2 Exhit	oit)		DATE Feb	February 1997	
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603869C CORPS SAM/Medium Extended Air Defense System - TMD	TITLE CORPS S/ stem - TM	AM/Medi D	um Exte	nded Air	PROJECT 1262	2
B. Program Change Summary (\$\sin Thousands)								
Previous President's Budget Appropriated Value	EY 1996 19,675	EY 1997 56,232 56,232	EY 1998 48,113	FY 1999 9,553		Total <u>Cost</u> 133,573		
a. MEADS below threshold reprogramming Current Budget Submit/President's Budget	20,123	26,232 56,232	47,956	605'6		133,820		
Change Summary Explanation: Funding: Background: This project was funded under PE 0603216C project 2212 prior to FY 95, PE 0603869C project 2262 in FY 95, and PE 0603869C project 1262 in FY 96 and beyond. Funding: FY 1996 (-319): Undistributed Defense-Wide Reduction. FY 1998 (-157): Undistributed Defense-Wide Reduction. FY 1999 (-44): Undistributed Defense-Wide Reduction. Schedule: None Technical: None	ier PE 0603216C project efense-Wide Reduction. efense-Wide Reduction. efense-Wide Reduction.	:t 2212 prior to F	Y 95, PE 060.	3869C proji	ct 2262 in	FY 95, and PE	0603869С рг	ject
C. Other Program Funding Summary (\$ in Thousands)								
N/A	FY 1997 FY 1998	998 EY 1999	FY 2000	FY 2001	FY 2002	FY 2003	To Compl	Total Cost
Project 1262	Page	Page 4 of 7 Pages			Exhib	Exhibit R-2 (PE 0603869C))3869C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603869C CORPS SAM/Medium Extended Air Defense System - TMD	PROJECT 1262
D. Schedule Profile FY 1996	FY 1997 FY 1998	EY 1999
า	· ×	
Contract Milestone: Int'l Teaming Contract Award PD-V Contract Award Release RFP for Design and Dev Complete PD-V	×	×
Other Program Events: Remts Harmonization w/GE/IT Sign MOU Establish NATO Agency Conduct SC Review1 Conduct SC Review3 * * * * * * * * * * * * *		
Project 1262 Po	Page 5 of 7 Pages	Exhibit R-2 (PE 0603869C)

RDI	RDT&E PROGRAM ELEMEN	3RAM EL		IT/PROJECT COST BREAKDOWN (R-3)	COSTB	REAKD	OWN (R-	3)	DATE	February 1997	760
BUDGET ACTIVITY 4 - Demonstration and Validation	lion and Va	lidation			РЕ NUMBE 060386 Defens	PE NUMBER AND TITLE 0603869C CORPS SAN Defense System - TMD	S SAM/M	PE NUMBER AND TITLE 0603869C CORPS SAM/Medium Extended Air Defense System - TMD	ended Air		РРОЈЕСТ 1262
A. Project Cost Breakdown (S in Thousands)	eakdown (S in	Thousands)									
Project Cost Category	'n			FY 1996		FY 1997	FY 1998	FY 1999	61		
CORPS SAM/MEADS Concepts Total	OS Concepts			20,123 20,123		56,232 56,232	47,956 47,956	9,509 9,509	6.6		
B. Budget Acquisition History and Planning Information	ion History an	d Planning Inf	formation (\$ i	n (\$ in Thousands)							
Performing Organizations:	zations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity <u>EAC</u>	Project Office EAC	Total Prior to	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations Lockheed Team FFP Raytheon Team FFP Project Def/Val FFP	nt Organizations FFP FFP FFP	i May-96 May-96 Oct-96			000	5,533 4,072 5,600	0 0 45,070	0 0 36,660	0 0 8,670	TBD CBT CBT	5,533 4,072 96,000
Support and Management Organizations NAMEADSMA I-H Support NAMEADSMA I-H Support U.S. Product Ofc I-H SPT/IOB	ment Organizal I-H Support I-H Support I-H SPT/IOB	tions		,	000	400 1,530 2,988	4,920 1,378 4,864	6,380 1,392 3,524	300 200 339	TBD TBD TBD	12,000 4,500 11,715
Test and Evaluation Organizations	Organizations										
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	ion History an	d Planning Inf	ormation Cor	ntinued (\$ in Tl	10usands)						
Project 1262				Pa	Page 6 of 7 Pages	ses		Exh	Exhibit R-3 (PE 0603869C)	0603869C)	

RDT&E PROGRA	AM ELI	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3		DATE Fe	February 1997	766
BUDGET ACTIVITY 4 - Demonstration and Validation	ation		PE NUMBER AND TITLE 0603869C COR Defense System	DE NUMBER AND TITLE 0603869C CORPS SAN Defense System - TMD	S SAM/Me TMD	dium Exte	PE NUMBER AND TITLE 0603869C CORPS SAM/Medium Extended Air Defense System - TMD		РРОЈЕСТ 1262
Government Furnished Property:									
Contract Method/Type Aw Item or Funding Ob Description Vehicle Dat	Award or Obligation <u>Date</u>	Delivery <u>Date</u>	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 199 <u>9</u>	Budget to Complete	Total Program
Product Development Property TBD									
Support and Management Property TBD									
Test and Evaluation Property TBD									
Subtotal Product Development		•		15,205	45,070	36,660	8,670		105,605
Subtotal Support and Management				4,918	11,162	11,296	839		28,215
Subtotal Test and Evaluation									
Total Project				20,123	56,232	47,956	6)206		133,820
Project 1262		Pay	Page 7 of 7 Pages	5 0		Exhi	Exhibit R-3 (PE 0603869C)	0603869C)	

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RDT	RDT&E BUDGET ITEM J	EM JUS	TIFICA.	TION SE	HEET (F	USTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	and Validation			PE NL 060 Def	PE NUMBER AND TITLE 0603870C Boos Defense Concel	ре NUMBER AND TITLE 0603870C Boost Phase Intercept Theater Missile Defense Concept Development	se Interd relopmer	sept The	ater Miss		РРОЈЕСТ 1294
\$) LSOO	COST (\$ in Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1294 UAV Boost Phase Intercept	ercept	0	23,276	12,885	0	0	0	0	0	ТВD	TBD
A. Mission Description and Budget Item Justification The UAV-Based Boost Phase Intercept (BPI) project UAV-Based BPI Concepts. Task 1 is a cooperative mitigation) of the UAV-based BPI concept which deterritory. This project is based on the use of Unman their boosting phase of flight. Task 1 efforts will be performed in the U.S. and will support and expand k of operation and employment in support of U.S. exp Battle Management, Command, Control, Communic U.S. technologies.	Intercept Bussed Boost Phase Intercept (BPI) project covers two tasks; Task 1: Israeli Boost Phase Intercept System (IBIS) Risk Mitigation, and Task 2: Cooperative UAV-Based Boost Phase Intercept (BPI) project covers two tasks; Task 1: Israeli (GOI) BPI program which involves further development and refinement (risk mitigation) of the UAV-based BPI concept which destroys tactical ballistic missiles in the boost phase of flight, before engine cutoff, preferably while in enemy territory. This project is based on the use of Unmanned Aerial Vehicles (UAV) armed with on-board interceptors to provide the means of destroying enemy missiles in their boosting phase of flight. Task 1 efforts will be performed in Israel and will focus on key elements of the IBIS concept. Task 2 of this cooperative effort will be performed in the U.S. and will support and expand key elements of the IBIS concept. It will include developing the UAV-based BPI system requirements of operation and employment in support of U.S. expeditionary forces. The requirements will address kinetic energy interceptors, UAVs, search and track sensors, Battle Management, Command, Control, Communications, Computers and Intelligence (BMC4I), and the concept of operations (CONOPS) based on readily available U.S. technologies.	ation roject covers ative U.S./G ich destroys t manned Aei III be perform and key elem S. expedition nunications,	two tasks; wernment o actical ballis ial Vehicles led in Israel lents of the l ary forces. ' Computers s	Task 1: Israel (GOI stic missiles (UAV) arm and will foci IBIS concept The requiren and Intelliger	eli Boost Ph in the boost ed with on-l us on key el- t. It will inc nents will ac	covers two tasks; Task 1: Israeli Boost Phase Intercept System (IBIS) Risk Mitigation, and Task 2: Coc. S./Government of Israel (GOI) BPI program which involves further development and refinement (risk roys tactical ballistic missiles in the boost phase of flight, before engine cutoff, preferably while in enerd Aerial Vehicles (UAV) armed with on-board interceptors to provide the means of destroying enemy afformed in Israel and will focus on key elements of the IBIS concept. Task 2 of this cooperative effort a elements of the IBIS concept. It will include developing the UAV-based BPI system requirements for ditionary forces. The requirements will address kinetic energy interceptors, UAVs, search and track secons, Computers and Intelligence (BMC4I), and the concept of operations (CONOPS) based on readily	System (IBI volves furthe ht, before en ptors to prover IBIS concering the UAV energy interpreted of operations.	is) Risk Miti ex developm ggine cutoff, ride the meal pt. Task 2 o 7-based BPI rccptors, UA	igation, and 'ent and refine preferably was of destroy of this cooper system requi NOPS) based	Task 2: Coo ement (risk while in ener ring enemy 1 rative effort irements for ind track ser d on readily	perative ny nissiles in will be scenarios ssors, available
Along with attack ope near term promise. Pi study concluded that s	Along with attack operations, the BPI concept is a means of destroying hostile ballistic missiles in enemy territory. UAVs armed with interceptors show significant near term promise. Previous cooperative investigations of the UAV-based BPI concept and a recent Air Force Airborne Laser (ABL) Analysis of Alternatives (AoA) study concluded that such a BPI system could be very cost effective and complementary to terminal missile defense systems.	is a means of tigations of t be very cost	destroying he UAV-bas effective and	hostile ballis sed BPI conc d compleme	stic missiles sept and a re ntary to tern	ons of destroying hostile ballistic missiles in enemy territory. UAVs and sof the UAV-based BPI concept and a recent Air Force Airborne Lase cost effective and complementary to terminal missile defense systems.	ritory. UAV e Airborne l defense syst	's armed wit Laser (ABL) ems.	h interceptor Analysis of	s show sign Alternative	ficant s (AoA)
FY 1996 (\$ in Thousands): - \$0 Cove: - \$0 Total	ands): Covered under PE0603872C. Total	72C.									
EY 1997 (\$ in Thousands): - \$16,000 Initial search - \$2,000 Valid - \$5,276 Analy - \$23,276 Total	nds): Search and track algorithms, fire control algorithms, and simulation of BMC4I technologies. Search and track algorithms, fire control algorithms, and simulation of BMC4I technologies. Validate UAV-based BPI system performance parameters through simulations and wargaming. Analyze technical issues including survivability, interceptor effectiveness, and lethality.	tivities with and, fire control (system perfincluding sur	the GOI. Er ol algorithm ormance par vivability, ii	nphasize dev is, and simul ameters thro nterceptor ef	velopment o lation of BM wgh simulat fectiveness,	with the GOI. Emphasize development of key lightweight i control algorithms, and simulation of BMC4I technologies. I performance parameters through simulations and wargaming survivability, interceptor effectiveness, and lethality.	ight intercer ogies. gaming.	otor seeker a	nd control sy	ystem techno	ologies,
Project 1294				Page 1 of 5 Pages	5 Pages			Exhibi	Exhibit R-2 (PE 0603870C)	603870C)	

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RDT&E BUDGET ITEM JUSTIFICAT	USTIFICATION SHEET (R-2 Exhibit)	R-2 Exhibit)	DATE February 1997	y 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603870C Boos Defense Concel	PE NUMBER AND TITLE 0603870C Boost Phase Interce Defense Concept Development	pt Theater M	РРОЈЕСТ 1294
FY 1998 (\$ in Thousands): - \$4,000 Demonstrate a prototype search, launch detection, tracking and discrimination capability. - \$3,885 Demonstrate, via simulation, key UAV performance and command and control parameter. - \$5,000 Develop a proof-of-concept demonstration plan. - \$12,885 Total	racking and discrimin e and command and c	ation capability. ontrol parameters. Furthe	aunch detection, tracking and discrimination capability. UAV performance and command and control parameters. Further refine interceptor design. onstration plan.	
FY 1999 (\$ in Thousands): - \$0 Troject continuation decision expected in Fiscal Year 1998. - \$0 Total	ar 1998.			
Acquisition Strategy: This program is a "hedge" for the ABL program. Conduct cooperative activities in the U.S. and Israel to mitigate risk of developing UAV-based BPI systems. The GOI will take the lead on risk mitigation of the interceptor while the U.S. will lead for the Infrared Search and Track (IRST) sensor activities in other system elements, such as BMC4I and system integration will be shared. The US and GOI will share costs. Task 1 is being done under a firm fixed price contract with Israeli industry. Task 2 is being accomplished by BMDO Tri-Service Integrated Product Teams (IPT) with additional support provided by industry.	Conduct cooperative a ptor while the U.S. wi The US and GOI will egrated Product Team	ctivities in the U.S. and I. Il lead for the Infrared Se share costs. Task 1 is bei s (IPT) with additional su	srael to mitigate risk of develop arch and Track (IRST) sensor a ng done under a firm fixed pric pport provided by industry.	ing UAV-based ctivities in other e contract with
B. Program Change Summary (\$\in\text{Thousands})				
FY 1996 Previous President's Budget Appropriated Value	F <u>Y 1997</u> 0 24,300	FY 1998 FY 1999 0 0	Total <u>Cost</u> 0 28,438	
Adjustments to Appropriated Value: a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	-999 -25 23,276	12,885	0 36,161	
Change Summary Explanation:				
Funding: Project funding, structure, and objective directed by Congress. Schedule: None Technical: None	'SS'			
Project 1294	Page 2 of 5 Pages		Exhibit R-2 (PE 0603870C)	.0C)

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RDT&E BUDGET ITEM		IFICAT	ION SH	EET (R	JUSTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Fe	February 1997	266
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NU 060	PE NUMBER AND TITLE 0603870C Boos Defense Concep	ուե oost Pha ncept Dev	PE NUMBER AND TITLE 0603870C Boost Phase Intercept Theater Missile Defense Concept Development	ept The	ater Miss		РRОЈЕСТ 1294
C. Other Program Funding Summary (\$ in Thousands)	ands)									
1294 UAV BPI, PE0603872C	FY 1996 5,705	EY 1997 930	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	To Compl TBD	Total Cost TBD
D. Schedule Profile										
	FY 1996	4	1 2 E	EY 1997 2 3	4 1	FY 1998 2 3	∞ € 4		FY 1999 2 3	4
Complete IBIS Follow-On Report Preliminary US UAV BPI Requirements Contract Milestone (Israeli) Risk Mitigation IBIS Risk Mitigation Final Report	×		×	×					×	
			,							
			Dans 2 of & Danse	2000			n 4	10) C 0	CAHHI DO (DE OGOSBATOC)	
Project 1294			rage July	r uges			LASHIO	7 7 7 11 6	20,000	

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RDT	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	RAM ELE	MENT/P	ROJECT	COSTB	REAKDO	JWN (R-:	3)	DATE Fe	February 1997	1997
BUDGET ACTIVITY 4 - Demonstration and Validation	ion and Vali	dation			PE NUMBE 060387 Defens	PE NUMBER AND TITLE 0603870C Boost Defense Concept	PE NUMBER AND TITLE 0603870C Boost Phase Interce Defense Concept Development	PE NUMBER AND TITLE 0603870C Boost Phase Intercept Theater Missile Defense Concept Development	eater Mis	sile	РРОЈЕСТ 1294
A. Project Cost Breakdown (\$ in Thousands)	eakdown (\$ in T	housands)									
Task 1 - IBIS Risk Mitigation Task 2 - Cooperative UAV-based BPI Concepts Total	litigation : UAV-based BPI	l Concepts		EY 1996 See PE0603872C See PE0603872C	EY 1996 603872C 603872C	FY 1997 17,976 5,300 23,276	FY 1998 7,615 5,270 12,885	FY 1999 0 0			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	on History and	Planning Info	rmation (\$ in	Thousands)							
Performing Organizations:	zations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	t Organizations	07	EV07/09	EV07/00	7637	c	250 51	7.616	c	Ę	
SMC	MIPR	FY96	0	0	/Y.Y.	1,350	0/2/1	0.00	00	TBD	•
Navy PEO IAD NAWC-CL DARPA	MIPR MIPR	FY97 FY96 FY96	300 2,750 0	300 2,750 0	Y X X	2,025 466 650	800 2,750 0	720 3,050 0	000	OBT OBT OBT	3,545 6,266 650
Support and Management Organizations	ment Organizatio	SIIS	c	,	ž	-	-	•	ć	Ę	
WJ Schaeler Assoc	Crrr MIPR	FY96	0	0	K K K K	1,1/1	067,1	000,1	0	TBD TBD	3,421
SMC	MIPR	FY97	250	250	N/A	0	250	250	0		٠,
Navy PEO TAD	MIPR	FY97	250	250	N/A	0	250	250	0		200
Test and Evaluation Organizations None	Organizations										
Project 1294				Pe	Page 4 of 5 Pages	'es		Exhi	Exhibit R-3 (PE 0603870C)	06038700	

RDT&E PROGRAM ELEME	IENT/PROJECT COST BREAKDOWN (R-3)	OST BR	EAKDO	WN (R-3		DATE Fe	February 1997	760
BUDGET ACTIVITY 4 - Demonstration and Validation	<u>.</u>	PE NUMBER AND TITLE 0603870C Boost Phase Interce Defense Concept Development	ND TITLE Boost F Concept I	hase Inte	PE NUMBER AND TITLE 0603870C Boost Phase Intercept Theater Missile Defense Concept Development	eater Mis		РКОЈЕСТ 1294
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	ation Continued (\$ in Thous	sands)		i				
Government Furnished Property:								
Contract Method/Type Award or Item or Funding Obligation De Description Vehicle Date Da	Delivery <u>Date</u>	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property								
Support and Management Property BMDO PR FY96			18					18
Test and Evaluation Property	•							
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation		7,527	4,491 1,214	21,526 1,750	11,385			44,929
Total Project		7,527	5,705	23,276	12,885			49,393
								
Project 1294	Page	Page 5 of 5 Pages	į		Exhi	Exhibit R-3 (PE 0603870C)	0603870C)	

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RDT&E BUDGET ITEM		TIFICA	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603871C National Missile Defense	пте lational N	Aissile Do	efense		PI 2	РRОЈЕСТ 2400
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2400 National Missile Defense	730,656	828,864	504,091	393,085	309,748	309,584	391,858	392,433	392,433 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

modernization programs for America's defense in the post-Cold War era. With the dissolution of the Soviet Union, the threat to the U.S. homeland from a deliberate or accidental ballistic missile attack by states of the former Soviet Union (FSU) or the Peoples Republic of China (PRC) was judged to be highly unlikely. In addition, the responding to this uncertain threat, the Department pursued a technology readiness strategy for National Missile Defense (NMD) to develop and maintain the ability to ability of Third World countries to acquire or develop a long range ballistic missile capability in the near future was considered uncertain. As a prudent approach for launches or Third World threats. In mid 1993, the Department of Defense (DoD) conducted a Bottom-Up Review (BUR) to select the strategy, force structure, and The objective of the National Missile Defense (NMD) program is to develop and maintain the option to deploy a cost effective, operationally effective, and Anti-Ballistic Missile (ABM) Treaty compliant system that will protect the United States against limited ballistic missile threats, including accidental or unauthorized deploy ballistic missile defenses for the United States should a threat emerge.

missile defense environment since the 1993 BUR. For the NMD program, the findings of this review resulted in an adjustment to the goal of the NMD program and a program is to develop, within three years, elements of an initial NMD system that could be deployed within three additional years after a deployment decision. This approach is commonly referred to as the NMD "3+3" program. The path towards accomplishing this goal includes: providing a near-term focus to reduce program risk; providing a hedge against the potential of more sophisticated emerging threats; and conducting an integrated NMD system test not later than FY99. All development efforts will be broadly based to preserve deployment option flexibility for a future decision on deployment of an ABM treaty compliant NMD system. In February 1996, the Department completed a comprehensive Ballistic Missile Defense Program Review that addressed changes that have occurred in the ballistic corresponding adjustment to the Future Years Defense Program which now includes additional resources in FY96-FY98 for NMD. The revised goal of the NMD

To achieve this goal, BMDO has initiated an NMD Deployment Readiness Program. In April 1996 the USD(A&T) initiated steps to designate NMD as an Acquisition deployment readiness. This approach focuses on demonstrating an NMD system level capability by FY99, and being able to deploy that capability within an additional Category (ACAT) 1D program and in July 1996 the program successfully completed its first Overarching Integrated Product Team (OIPT) review. The intent of the NMD Deployment Readiness Program is to position the U.S. to respond to a strategic missile threat as it emerges by shifting emphasis from technology readiness to path towards an objective system capability and the program will continue to maintain the ability to deploy within three years after a decision is made to do so. With three years, if required to do so by the threat. If no threat materializes at the end of the three year development period, evolutionary development will continue on a this approach, no commitment to deploy is made until the threat emerges.

Project 2400

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Exhibit R-2 (PE 0603871C)

RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603871C National Missile Defense	2400
The NMD system is commosed of several elements which are required to nearform	it is a required to merican the less three time in a less that	

event of an early NMD deployment within three years of the FY99 NMD integrated system test. SBIRS, which will provide midcourse tracking of targets, is currently Based Radar (GBR) and the Space Based Infrared System (SBIRS) Low component (previously known as the Space and Missile Tracking System) provide the dual sensor phenomenology required to address the full spectrum of potential threats. In addition, Upgraded Early Warning Radars (UEWR) are candidate sensors in the which are required to perform the key functions involved in a ballistic missile defense engagement. The Ground Management/Command, Control, and Communications (BM/C3) element provides engagement planning and human-in-control management of the engagement. managed and funded by the Air Force. The Ground Based Interceptor (GBI) is the weapon element that engages and destroys the threat. The Battle

individual elements. NMD Integration activities integrate the individual elements into a unified and coordinated NMD system. Deployment Planning activities focus enhanced capabilities are being prioritized and funded to the extent possible. In addition, several related activities are being performed in support of the development on the planning required to field the NMD system. Test and Evaluation activities provide management of the NMD T&E program. And Program Support provides Concurrent with the development of these elements, technology development efforts focused on achieving an early NMD capability and providing a path to future of the NMD system. System Engineering develops the NMD system-level performance and integration requirements and flows these requirements down to the overall program management and analysis support. All NMD activity areas are described in more detail below.

Prior to commitment of interceptors, the radar performs surveillance autonomously or as cued by SBIRS Low or other sensors, and will acquire, track, classify/identify Communications System (IFICS) an In-Flight Target Update (IFTU) and a Target Object Map (TOM) to the interceptor(s). The GBR is an incremental development program derived from the former NMD-GBR program and will leverage the Theater Missile Defense GBR program to resolve the critical radar issues applicable to NMD. A GBR prototype, designated as GBR-P, will be installed at USAKA in FY98 and will be available as part of the FY99 NMD integrated system test (IFT-5). GBR is the primary fire control sensor, providing surveillance, acquisition, tracking, discrimination, fire control support and kill assessment for the NMD system. and estimate trajectory parameters for targets. In post-commit, the radar will discriminate and track the target(s), and provide via the In-Flight Interceptor

support the NMD mission. The UEWRs will detect, track and count the individual objects in a ballistic missile attack early in their trajectory. The UEWR data can be defense deployment decision, the appropriate BMEWS and/or PAVE PAWS radars will be upgraded for inclusion in the NMD architecture. If needed, other existing used for interceptor commit and GBR cueing in the event of an early deployment Depending on the anticipated threat (East Coast or West Coast) at the time of a UPGRADED EARLY WARNING RADARS incorporate the software upgrades and modest hardware changes required by the existing Early Warning Radars to orward based radars (such as Cobra Dane or HAVE STARE) could also be used to support NMD.

development is complete, EKV flight tests will be flown on the Payload Launch Vehicle (PLV), which is a booster consisting of a Minuteman II second and third stage. on accomplishing the NMD integrated system test in FY99. The initial focus of GBI development is the exo-atmospheric kill vehicle (EKV) which is the most critical The GROUND BASED INTERCEPTOR is using an evolutionary acquisition strategy to develop and demonstrate the NMD interceptor capability, with an emphasis EKV sensor flight tests are scheduled for FY97 and EKV interceptor flight tests are scheduled for FY98 and FY99. The two current EKV contractors will be and technically challenging part of the GBI. Development of an EKV booster and the associated launch control equipment will begin in FY98. Until booster downselected to one in FY98

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Exhibit R-2 (PE 0603871C)



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4 - Demonstration and Validation	0603871C National Missile Defense	2400

The BATTLE MANAGEMENT, COMMAND, CONTROL AND COMMUNICATIONS activity uses an evolutionary approach to incrementally prototype the BM/C3 of NMD sensors and interceptors for maximum system performance and kill assessment; provide interface with existing and planned C3 systems; prototype an In-flight the BM/C3 development and system behavior. NMD BM/C3 supports the NMD command and control process required to provide human-in-control; develop, assess, BM/C3 prototypes will be integrated and demonstrated at the Joint National Test Facility (JNTF) with USSPACECOM/NORAD user participation to refine and focus and select missile defense strategies and tactics; fuse and correlate available sensor information for discrimination; integrate and plan the complimentary coordination functionality required for the NMD mission, and integrate and demonstrate an NMD system in step with evolving NMD sensors and interceptor element capabilities. Interceptor Communications System (IFICS) for BM/C3-GBI communication.

(C2) simulations. Analyses, simulations, and tests are performed to address the system effectiveness and concept of operations of proposed NMD system architectures program elements. This results in a balanced system capability, and readiness through incremental element development on a path to an objective system deployment against near- and far-term ballistic missile threats. These results support activities required for strategic C2 simulations where the CINCs identify roles, missions and operations (CONOPS) development and evaluation, and command and control (C2) simulation analysis activities. This effort includes interaction with the user with respect to operational requirements, CONOPS, integration of multi-sensor systems, and operational evaluation of R&D activities in support of command and control threat may be. System engineering is an integral part of the components performance verification, test planning and analysis, deployment planning, user concept of capability. Throughout this process, systems engineering interacts with and ultimately defines the architecture required to meet and defeat whatever the prescribed SYSTEM ENGINEERING translates user requirements into NMD system-level performance and integration requirements and flows them down to the individual requirements for an effective NMD system.

responsibility for integrating the GBI; developing, integrating and demonstrating the NMD system; and developing NMD deployment options. Parallel concept NMD INTEGRATION activities focus on integrating the individual NMD elements into a cohesive NMD system. The Lead System Integrator (LSI) will have definition study contracts will be awarded in FY97, with downselect and contract award to a single LSI contractor in FY98

deployment decision is made. The deployment planning effort will be captured in the NMD Integrated deployment Plan. Deployment planning activities also include planning for life cycle logistics support. Other efforts include environmental analyses and documentation, site activation planning, human systems integration, site the identification of critical actions and timelines for fielding the NMD system, the identification of actions that would mitigate the risks to deployment, and initial DEPLOYMENT PLANNING activities focus on planning and logistics activities which support a decision to deploy, and the deployment of the NMD system if a analyses, industrial base assessments and operational suitability assessments.

provided including the Integrated System Test Capability (ISTC) for NMD HWIL testing and simulation activities, and development and validation of targets for NMD sensor and EKV intercept tests. Planning includes overseeing the development and coordination of documentation essential to the conduct of testing -- the overall test TEST AND EVALUATION activities involve providing the planning and management to support the NMD test and evaluation program. Some test infrastructure is simulation validation, verification and accreditation (VV&A). Management activities include development of the NMD Test and Evaluation Master Plan (TEMP), strategy, the Cost Analysis Requirements Document (CARD), detailed test plans, interface control documents, lethality plans, post-test data analysis plans, and review and analysis of test results, and coordination of test assets.

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RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit)	PAIE February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE	TOBIORG
4 - Demonstration and Validation	0603871C National Missile Defense	2400
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processing, and optics hardware for the objective SBIRS Low satellite system. Research and development of components, devices and sub-systems required for the SBIRS Low system will continue, supportive technologies in infrared focal plane testing, cryocooler development and radiation testing of electronics and optics SENSOR TECHNOLOGY focuses on the development of advanced technologies in infrared focal planes, cryogenics, radiation hardened electronics and signal hardware will be pursued. PROGRAM SUPPORT provides management and analysis support to the NMD programs in areas such as cost/schedule/performance assessments, cost estimating and analysis, budget analysis and formulation, program planning and control, and contract management.

OTHER NMD INITIATIVES addresses the USAF NMD initiative to fully explore the USAF NMD concept, including utilizing test facilities which provide a realistic and representative test scenario. Specific activities remain under review but may include performing sensor track/data fusion, transmitting in-flight target updates and target object maps to an interceptor, acquiring targets with a sensor package, and demonstrating that the launch control system meets or exceeds NMD timeline requirements PHENOMENOLOGY provides the U.S. with the capability to generate high confidence target signatures for ballistic missile defenses. This is a critical adjunct to the design and evaluation of NMD system performance across the full spectrum of threats and engagement scenarios. This program provides signature collection sensors for live-fire missions and storage of the resulting test data. This program provides predictive models of target signatures and develops algorithms for the critical functions of discrimination, target handover and aimpoint selection.

synergistic manner across all NMD and TMD efforts. Systems analysis work is done to determine the expected operation of effectiveness and life cycle cost impacts of the NMD system based on changing threats, mission requirements, acquisition reform initiatives and advances in technology. It includes implementation within ARCHITECTURE ANALYSIS/BMC3 INITIATIVES sumports an initiative to ensure that system architecture and BM/C3 are addressed in a coordinated and BMDO of DoD initiatives in C4ISR architectures, technical architecture and open systems.

description in the form of an annual report, the NMD System Threat Assessment (NMDSTA); 2) Threat scenario generation; and 3) Countermeasure integration, which THREAT AND COUNTERMEASURES defines potential adversary missile forces which the NMD system could confront. This includes 1) Intelligence threat integrates countermeasures (CM) technology into NMD elements.

supercomputing resources at the Joint National Test Facility (JNTF) and the Advanced Research Center/Simulation Center (ARC/SC), and the engineering expertise MODELING AND SIMULATION provides for the development and validation of modeling and simulation (M/S) tools and techniques. This project provides and integration support to operate these facilities.

instrumentation, and common test beds for NMD HWIL testing and simulation activities. Common ground test facilities include: Kinetic Kill Vehicle Hardware-in-TEST RESOURCES provides the infrastructure to support the NMD test and evaluation program. Test infrastructure includes common test ranges and

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Exhibit R-2 (PE 0603871C)



RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	
BUDGET ACTIVITY 4 - Demonstration and Validation	and Validation PE NUMBER AND TITLE PROJECT 0603871C National Missile Defense 2400	
the-Loop Simulator Facility (NHTF) at Buffalo, NY; Center Engineering Develo Rockwell Internation and infrared and bla Missile Range (KMI Common range insti (HALO) with the In Beam Director (SLE)	the-Loop Simulator (KHILS) at Eglin AFB, FL; Hypervelocity Wind Tunnel Number 9 at the Naval Surface Warfare Center, White Oak, MD; National Hover Test Facility (NHTF) at Edwards AFB, CA; Kinetic Energy Weapon Digital Emulation Center at Huntsville, AL; Aero optic Evaluation Center (AOEC) at Calspan Corp, Buffalo, NY; Center for Research Support (CERES) at Falcon AFB, CO; Army Missile Optical Range (AMOR) at Huntsville, AL; 7V and 10V chambers at Arnold Engineering Development Center (AEDC) in Tullahoma, TN; Portable Optical Sensor Tester (POST) and Characterization of Low Background Mosiacs (CALM) at Rockwell International in Anaheim, CA; Naval Research and Development (NRaD) at the Naval Command, Control and Ocean Surveillance Center in San Diego, CA; and infrared and blackbody standards at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD. Common range facilities include Kwajalein Missile Range (KMR) in the Marshall Islands; Western test Range (WRT) at Vandenburg AFB, CA; and the Pacific Missile Range facility (PMRF) at Kauai, HI. Common range instrumentation includes special test equipment, data collection assets and range instrumentation upgrades including: High Altitude Observatory (HALO) with the Infrared Imaging System (IRIS) based at Aeromet, Inc. in Tulsa, OK; the Remote Area Safety Aircraft (RASA) based at Point Mugu, CA; the SeaLite Beam Director (SLBD) at White Sands Missile Range, NM; KMR improvements and modernization; and the Kwajalein Mobile Range Safety System (KMRSS).	te t:
OPERATIONAL SU Missile Defense Ore Defense Command, project supports fun	OPERATIONAL SUPPORT provides personnel and related support costs common to all NMD projects including support to the Office of the Director, Ballistic Missile Defense Organization (BMDO) and his staff located in Washington, DC, as well as BMDO's Executing Agents within the U.S. Army Space and Strategic Defense Command, U.S. Army PEO Missile Defense, U.S. Navy PEO for Theater Defense, U.S. Air Force PEO office and the Joint National Test Facility. This project supports funding for overhead/indirect personnel costs, benefits and infrastructure costs such as rents, utilities and supplies.	
This project is assign Defense policy.	This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy.	
FY 1996 (\$ in Thousands): - \$87,000 GBR. transt Elect USA1 integi	GBR: Complete contract modification to incorporate a growable antenna design into the NMD prototype radar. Complete fabrication of transmit/receive modules. Conduct environmental, facility, and site analysis at USAKA; develop facility requirements documentation and Electromagnetic Radiation/Electromagnetic Interference (EMR/EMI) analysis. Award facility construction contract and begin construction at USAKA. Continue development of software Realtime Digital Simulation (RDS) and Hardware In the Loop (HWIL) simulation. Fabricate, integrate and begin near-field verification testing of pilot antenna array. Procure remaining piece parts for the GBR-P antenna. Conduct Preliminary Design Review (PDR).	···
- \$8,490	UEWR: Conduct realtime missile tracking experiments using EWR. Define, develop and demonstrate the feasibility and utility of modifying EWR and other existing sensors for NMD mission support. Award UEWR Demonstrator contract.	
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Gu	"DT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) PATE February 1997	
BUDGET ACTIVITY 4 - Demonstration and Validation	and Validation PENUMBER AND TITLE PROJECT 0603871C National Missile Defense 2400	ECT C
- \$259,764	GBI: Integrate EKV sensors with PLV boosters and interface the missile with the test range. Acquire long-lead PLV booster hardware for FY98 kill vehicle flight tests and fabricate upper stage. Interface with BM/C3 element for FY98 flight tests. Fabricate EKV seeker, avionics processor, structure, and propulsion subsystems for the competitive FY98 kill vehicle flight test. Conduct software CDR. Integrate hardware and software, and conduct HWIL and simulations on the EKV flight test vehicle. Reactivate U.S. Army Kwajalein Atoll (USAKA) GBI facilities and supporting activities. Resume SHIELD silicon FPA readout electronics and hardening design work. Continue PET HgCdTe FPA development, focusing on reduced size readout electronics. Conduct 20/44 GHz transceiver preliminary brass board demonstration, including ground-to-ground test range demo. Continue development of a lightweight, low cost vectorable nozzle. Execute simulated high altitude booster nozzle static firing.	Y98 e PA g ster
- \$72,160	BM/C3: Conduct BM/C3 engineering and integration activities to support BM/C3 Prototype development, BM/C3 communications component prototype development and NMD system integration activities. Develop and demonstrate the BM/C3 Legacy Plus capability. Start development of the first increment of the BM/C3 Prototype. Support NMD tests by providing integrated BM/C3 products as test articles. Use Minuteman III FOT&E flights as targets of opportunity for BMC3 development. Support IGT-2. Develop contract requirements package for the In-Flight Interceptor Communications System (IFICS).	nent ment n III
- \$56,038	System Engineering: Assess and translate user requirements into system requirements documents based on the updated Capstone ORD/CRD and CONOPS. Baseline interface and configuration control requirements in support of the NMD Deployment Readiness Program. Analyze and update contingency deployment options. Provide system level requirements to test execution of ISTC-1 and -2 and IFT-1. Analyze and validate results of IGT-2. Support preparations for IFT-1, IFT-2, and ISTC-1 and -2. Update technical documentation baseline (NMD Capability Assessment, NMM, and NSEN/IDN) and JNTF system simulations based upon test results to date. Conduct NMD System Requirements Review (SRR) to define the NMD Capability 2 (C2) architecture.	and date view
- \$11,475	Deployment Planning: Modify NMD deployment plans based on NMD deployment readiness program developments for early options. Conduct critical path analysis of NMD deployment options and determine pre-deployment timeline reduction activities. Integrate systems operational suitability planning activities into NMD engineering integration and test programs. Support NMD integrated systems tests by providing analytical and planning support. Conduct deployment logistics and sustainment support analysis for the deployment options. Conduct site, facility and environmental tasks to preserve three year deployment timeline.	duct
- \$70,385	Test and Evaluation: Supported ISTC integration testing and integration of BM/C3 Legacy Plus configuration into the ISTC. Began the production of the NMD TEMP and CARD with the support of the NMD System T&B Program Integrated Product Team (PIPT). Coordinated test range infrastructure and upgrades to support IFT-1 and IFT-2 scheduled for launch from KMR in FY97. Completed integration and launch of MSX targets on STARS/ODES and participated in MSLS demonstration launch. Completed target builds for IFT-1 and IFT-2.	ed nch
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RD.	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	
- \$87,806	Sensor Technology: Delivered two lots of HgCdTe LWIR FPA hybrids from each contractor for performance testing and verification. Initiated/continued endurance testing on 150K PSC and 35/60K pulse tube and Stirling coolers. Delivered three 60K PSC units for characterization and endurance testing. Initiated advanced optical coating development. Completed fabrication and testing of ultra high performance 12 bit analog-to-digital converter. Completed radiation hardened 1Mbit static random access memory development. Completed board-level demonstration of rad-hard, fault tolerant 32-bit microprocessor and associated support circuits to verify function and performance. Initiated cryocooler thermal bus effort to support thermal integration and heat removal. Launched the MSX satellite and began data collection experiments. Delivered cryocoolers, MWIR filters and IR calibration source for STRV-2 flight experiment.
- \$20,902	Program Support: Continue to provide management and analysis support to the NMD program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.
- \$18,741	Phenomenology: Provided Airborne Surveillance Testbed (AST) core support for MSX Dedictated Targets (MDT-1, MDT-2) and Red Tigress III missions to collect optical data. Populated NMD target database. Developed five discrimination algorithms for GBR-P. Archived and distributed MSX data.
- \$3,051	Architecture Analysis/BMC3 Initiatives: Evaluated the capability of an evolving NMD architecture, the SMTS sensors under development, RV/decoy discrimination techniques, and the application of advances in TMD component technology to NMD systems. Defined BM/C3 architectural and development process requirements to facilitate the translation of operational requirements to interoperable, affordable, evolvable, and supportable systems. Provided mission area capability to address emerging BM/C3 requirements issues and facilitate their resolution in a synergistic manner.
- \$7,945	Threat and Countermeasures: Provided NMDSTA and operational threat environment intelligence estimates, continued development of threat system scenario descriptions, upgraded threat modeling capability and digital media threat products. Performed counter-countermeasure parametric studies, supported teams conducting CM concept, design, and flight tests, and began design work on dedicated countermeasures flight experiment.
- \$16,041	Modeling and Simulation: Provided supercomputing resources and staff capability at the JNTF, continued to plan and conduct wargames, conducted command and control simulations (C2sims), developed and operated the NMDSim tool and BMD Simulation Support Center (SSC). Provided supercomputing resources at the ARC/SC to develop and operate a multiple experiment test bed for ISTC testing, and other modeling and simulation support.
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RI	RDT&E BUDGET ITEM JUSTIFICATIO	USTIFICATION SHEET (R-2 Exhibit) DATE February 1997	7 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	n and Validation	PE NUMBER AND TITLE 0603871C National Missile Defense	РКОЈЕСТ 2400
- \$10,858	Test Resources: Achieved IOC for the 10V space cham analytic support at KDEC, IR seeker HWIL testing at K NMD safety net integration and flight support capabilit CALM, NRaD, and AEDC 7V/10V, phenomenology cl	Test Resources: Achieved IOC for the 10V space chamber. Provided ground test facility infrastructure and upgrades; digital emulation and analytic support at KDEC, IR seeker HWIL testing at KHILS, wind tunnel testing at Tunnel 9, shock-tunnel testing at AOEC, hover test and NMD safety net integration and flight support capability at NHTF, command/control technology experiments at CERES, sensor testing at POST, CALM, NRaD, and AEDC 7V/10V, phenomenology characterization at AMOR and KHILS, and primary IR standards at the NIST.	tion and r test and ting at POST,
- \$730,656	Total		
EY 1997 (\$ in Thousands): - \$66,129 GBR with a Demy	usands): GBR: Conduct CDR and baseline the NMD-GBR-P Diwith a Joint Occupancy Date in 3QFY97. Begin integrammer Dem/Val radar for NMD uses. Deliver RDS and HWII Block 1 and 2.	unds): GBR: Conduct CDR and baseline the NMD-GBR-P Design. Begin assembly and testing of antenna subarrays. Continue facility construction with a Joint Occupancy Date in 3QFY97. Begin integration and installation of the GBR-P at USAKA. Begin modifications to the TMD-GBR Dem/Val radar for NMD uses. Deliver RDS and HWILS to support software validation and Integrated Ground Tests (IGTs). Deliver Software Block 1 and 2.	onstruction TMD-GBR /er Software
- \$12,122	UEWR: Initiate UEWR upgrade development. Recommended EWR upg effectiveness and cost of hardware and software options for modifying EV coordination with NMD test and evaluation, system engineering and BMC assessed. Potential use of Forward Based X-Band Radar will be assessed.	UEWR: Initiate UEWR upgrade development. Recommended EWR upgrade solution will be determined by evaluating the feasibility, effectiveness and cost of hardware and software options for modifying EWRs to support NMD. Targets of opportunity will be supported in coordination with NMD test and evaluation, system engineering and BMC3 efforts. Potential ISTC use of existing EWR HWIL assets will be assessed. Potential use of Forward Based X-Band Radar will be assessed.	lity, ported in sets will be
- \$236,319	GBI: Conduct two EKV sensor flight tests (IFT-1 and the FY98 and FY99 intercept flight tests. Complete fal EKV/PLV booster hardware and software integration, FY99 EKV flight tests. Update and validate EKV sens program to develop 256X256 silicon FPAs. Complete Initiate development/fabrication/testing of EKV transce Continue PET program to develop HgCdTe FPAs.	GBI: Conduct two EKV sensor flight tests (IFT-1 and IFT-2), complete data analysis, and incorporate any required changes in preparation for the FY98 and FY99 intercept flight tests. Complete fabrication, assembly, and testing of EKV hardware for the FY98 flight test. Continue EKVPLV booster hardware and software integration, flight qualification, and acceptance testing. Acquire long-lead PLV booster hardware for FY99 EKV flight tests. Update and validate EKV sensor, kill vehicle models and simulations based on seeker flight data. Continue SHIELD program to develop 256X256 silicon FPAs. Complete phase I transceiver package development and transfer effort to EKV prime contractors. Initiate development/fabrication/testing of EKV transceivers and IFICS modern suitable for use in the FY99 NMD integrated system test. Continue PET program to develop HgCdTe FPAs.	paration for Continue hardware for e SHIELD contractors. n test.
- \$50,576	BM/C3: Conduct BM/C3 engineering and ihtegration activities to support BM/C3 prototype prototype development and NMD system integration activities. Complete development of the prototype, fully integrated with current increments of other BM/C3 components and with app BM/C3 prototype third increment. Support NMD tests by providing integrated BM/C3 prodintegration Tests-1 and -2, and IGT-1A. Deliver IFICS test assembly to support NMD tests.	development, BM/C3 con e first and second incolicable external syst. Licts as test articles. Suppo	omunications component of the BM/C3 Start development of rt IFT-1, IFT-2, ISTC
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BUDGET ACTIVITY 4 - Demonstration and Validation	n and Validation PE NUMBER AND TITLE 0603871C National Missile Defense	PROJECT 2400
- \$42,542	System Engineering: Evaluate and refine user requirements into system requirements documents (SRDs), and Interface Requirement Documents (IRDs) based on updated Capstone ORD/CRD and CONOPS. Refine interface and configuration control requirements. Analyze and update contingency deployment options and continue to provide systems analysis in support of objective contingency deployment. Analyze and validate results of IFT-1, IFT-2, ISTC-1, and ISTC-2. Support preparations for IFT-3, IFT-4 and the NMD integrated system test (IFT-5). Update technical documentation baseline (NMD Capability Assessment, NMM and NSEN/IDN) and JNTF system simulations based upon test results to date.	ent Documents ce and alysis in support of for IFT-3, IFT-4 and NSEN/IDN)
- \$58,046	NMD Integration: Issue Request for Proposal for system integrator concept definition contracts. Make multiple contract awards and initiate parallel concept definition studies with up to three contractors.	ırds and initiate
- \$17,139	Deployment Planning: Complete the initial NMD Integrated Deployment Plan and initial Site Activation Plan. Continue preliminary site activation planning. Assess the operational suitability requirements and the compliance of the NMD system and elements. Develop NMD Master Integrated Program Schedule for the development and deployment of the NMD system. Develop environmental compliance plan for the NMD system. Conduct deployment and logistics assessments in support of the NMD PDR.	iminary site evelop NMD pliance plan for the
8101,599	Test and Evaluation: Support ISTC Integration Tests 1 and 2, and integration of the following functions into the ISTC: BM/C3 Capability Increment 1 and 2; EKV realtime simulation for both contractors; GBR-P testbed; UEWR and X-band radars. Complete and maintain currency of TEMP, CARD and Test Strategy with the support of the NMD System T&E PIPT. Implement V&V plan for ISTC. Complete program documentation, pre-launch preparations and oversee execution of IFT-1 and IFT-2. Evaluate post-test results. Coordinate test range infrastructure and upgrades to support EKV flight tests from KMR. Coordinate range instrumentation upgrades and provide data collection and analysis for NMD testing. Conduct target launch for two EKV sensor flight tests (IFT-1 and IFT-2).	3 Capability maintain currency plete program st range data collection and
- \$54,134	Sensor Technology: Initiate advanced optical coating development. Initiate follow-on program for LWIR HgCdTe FPAs and deliver 2 lots of hybrid arrays for testing. Deliver 35/60K PSC for characterization testing. Initiate/continue endurance testing on 150K PSC, 60K PSC, 35/60K PSC, 35K turbo cryocooler and 35/60K pulse tube cryocoolers. Complete prototype rad-hard 4Mbit SRAM. Complete prototype high speed, 14-bit analog-digital converter. Complete prototype rad-hard, fault-tolerant 32 bit processor. Continue non-cryogenic FPA signal processor. Initiate rad-hard visible star tracker effort. Deliver additional 60K PSC cooler. Complete thermal bus effort. Continue the collection and analysis of background and target data from the MSX satellite.	d deliver 2 lots of , 60K PSC, 35/60K otype high speed, iignal processor. ollection and
. \$31,100	Program Support: Continue to provide management and analysis support to the NMD program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.	/performance ant.
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BUDGET ACTIVITY 4 - Demonstratio	SUDGET ACTIVITY 4 - Demonstration and Validation 2400
- \$52,945	Other NMD Initiatives: The USAF NMD initiative will fully explore the USAF NMD concept, including utilizing test facilities which provide a realistic and representative test scenario. Specific FY97 activities remain under review but may include performing sensor track/data fusion, transmitting in-flight target updates and target object maps to an interceptor, acquiring targets with a sensor package, and demonstrating that the launch control system meets or exceeds NMD timeline requirements.
- \$19,587	Phenomenology: Provide AST core support for IFT-1, IFT-2, MDT-3 and MDT-4 missions to collect optical data. Receive, archive and distribute test data. Perform optical and radar data analysis of IFT-1, IFT-2, MDT-3 and MDT-4 for NMD system design and test. Develop and analyze higher order discrimination algorithms. Upgrade modeling of radar and IR target signatures.
- \$1,989	Architecture Analysis and BM/C3 Initiatives: Continue systems analysis work on NMD issues. Provide system-level capability to address emerging BM/C3 architectures and requirements in a synergistic manner across all NMD/TMD efforts and facilitate the translation of operational requirements to interoperable, affordable, evolvable, and supportable systems.
- \$7,168	Threat and Countermeasures: Provide NMDSTA and operational threat environment intelligence estimates, continue development of threat system scenario descriptions, and upgrade threat modeling capability and digital media threat products. Perform CM concept design and flight tests, continue work on dedicated countermeasures flight experiment.
- \$32,803	Modeling and Simulation: Provide infrastructure and core capability funding for the JNTF for hardware, software, and systems engineering, and other capabilities for system support, and supercomputing and wargaming resources. Provide maintenance of the SSC, and M/S support in the five primary areas of standardization, assessments, development/modification, computer architecture/ networks, and program management for M/S programs. Provide supercomputing resources at the ARC/SC and validate simulators. Upgrade all computer capabilities and establish a WAN.
- \$11,554	Test Resources: Provide ground test facility infrastructure and upgrades including: HWIL testing at KHILS, wind tunnel testing at Tunnel 9, shock-tunnel testing at AOEC, hover test and NMD safety net integration and flight support capability at NHTF, command/control technology experiments at CERES, lethality tests at AEDC Range C, sensor testing at POST, CALM, NRaD, and 7V/10V phenomenology characterization and target signatures at AMOR and KHILS, and primary IR and black body calibration standards at the NIST. Provide test range infrastructure and upgrades to support EKV testing. Provide range instrumentation, upgrades, data collection and analysis for BMDO testing. Provide data collection and processing.
- \$33,112	Operational Support: Continue providing management and support for overhead/indirect fixed costs.
- \$828,864	Total
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	RDT&E BUDGET ITEM JUSTIFICATIO	JUSTIFICATION SHEET (R-2 Exhibit) PATE Febru	February 1997
BUDGET ACTIVITY 4 - Demonstra	BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C National Missile Defense	PROJECT 2400
FY 1998 (\$ in Thousands): - \$19,536 GBR: integr	: Conduct CONUS Readir ration and installation of th cation test in 3QFY98.	unds): GBR: Conduct CONUS Readiness Review. Complete facility construction with a Beneficial Occupancy Date in 1QFY98. Complete integration and installation of the GBR-P at USAKA. Conduct USAKA Readiness Review. Deliver Software Block 3. Conduct on-line system verification test in 3QFY98.	aplete t on-line system
- \$16,745	UEWR: Continue the conduct of real-time missile trac Demonstrator for participation in NMD integrated syst Manage UEWR portion of the LSI contract.	UEWR: Continue the conduct of real-time missile tracking experiments using EWR and other applicable existing sensors. Provide UEWR Demonstrator for participation in NMD integrated system tests. Continue system development and program risk definition and risk reduction. Manage UEWR portion of the LSI contract.	ide UEWR isk reduction.
- \$127,551	GBI: Conduct one EKV interce for IFT-4. Following EKV dow (IFT-5). Acquire PLV hardwar Integrator booster development the FPA material of the winning	GBI: Conduct one EKV intercept flight experiment (IFT-3). Reduce flight test data and incorporate results into HWIL simulations to prepare for IFT-4. Following EKV downselect, complete the winning contractor's EKV fabrication for IFT-4 and for the NMD integrated system test (IFT-5). Acquire PLV hardware to support FY99 flight testing. Fabricate EKV components for FY00 flight testing. Begin Lead System Integrator booster development. Terminate either the PET or SHIELD FPA development effort, preserving the program which corresponds to the FPA material of the winning EKV contractor.	ons to prepare ed system test d System corresponds to
- \$43,730	BM/C3: Conduct BM/C3 engineering and integration prototype development and NMD system integration a integrated with current increments of other BM/C3 cor prototype fourth increment. Support NMD tests by pre Integration Test-3.	BM/C3: Conduct BM/C3 engineering and integration activities to support BM/C3 Prototype development, BM/C3 communications component prototype development and NMD system integration activities. Complete development of the third increment of the BM/C3 Prototype, fully integrated with current increments of other BM/C3 components and with applicable external systems. Start development of the BM/C3 prototype fourth increment. Support NMD tests by providing integrated BM/C3 products as test articles. Support IFT-3, IGT-1A, and ISTC Integration Test-3.	ions component totype, fully BM/C3 A, and ISTC
- \$41,941	System Engineering: Assess and refine user requireme Finalize interface and configuration control requiremendeployment planning. Analyze and validate results of J documentation (NMD Capability Assessment, NMM,)	System Engineering: Assess and refine user requirements based on updated Capstone ORD/CRD and CONOPS against system requirements. Finalize interface and configuration control requirements in support of deployment options. Continue to analyze and update contingency deployment planning. Analyze and validate results of IFT-3. Support preparations for IFT-4, IFT-5 and IGT-2A. Update technical documentation (NMD Capability Assessment, NMM, NSEN/IDN) and JNTF system simulations based on test results to date.	equirements. ntingency cal
- \$7,085	NMD Integration: Complete parallel system integrator	NMD Integration: Complete parallel system integrator concept definition studies. Downselect to one LSI contractor. Initiate LSI base contract.	SI base contract.
- \$16,613	Deployment Planning: Update the NMD Integrated Deployment Plan and the NMD Site Acti refinements in the NMD architecture. Support development of the NMD System Training Pl the areas of program and deployment schedule integration, critical path analysis and identific Continue environmental analyses of candidate deployment sites and required documentation.	Deployment Planning: Update the NMD Integrated Deployment Plan and the NMD Site Activation Plan to reflect programmatic changes and refinements in the NMD architecture. Support development of the NMD System Training Plan and System Safety Plan. Efforts will continue in the areas of program and deployment schedule integration, critical path analysis and identification of deployment risk mitigation actions. Continue environmental analyses of candidate deployment sites and required documentation.	changes and will continue in actions.
Project 2400	Pas	Page 11 of 26 Pages Exhibit R-2 (PE 0603871C)	871C)

	RDT&E BUDGET ITEM JUSTIFICATIO	JUSTIFICATION SHEET (R-2 Exhibit)	February 1997
BUDGET ACTIVITY 4 - Demonstrat	BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C National Missile Defense	PROJECT 2400
- \$83,705	Test and Evaluation: Support ISTC Integration Test 3 and It 3; GBI HWIL upgrade, and realtime simulations. Maintain T&E PIPT. Complete program documentation, pre-launch I VV&A of IFT-3 target and implement accreditation plan for infrastructure and upgrades to support EKV flight tests from analysis for NMD testing. Conduct target launch for IFT-3.	Test and Evaluation: Support ISTC Integration Test 3 and IGT-1A, and integration of the following into the ISTC: BM/C3 Capability Increment 3; GBI HWIL upgrade, and realtime simulations. Maintain currency of TEMP, CARD and Test Strategy with the support of the NMD System T&E PIPT. Complete program documentation, pre-launch preparations and oversee execution of IFT-3. Evaluate post-test results. Complete VV&A of IFT-3 target and implement accreditation plan for ISTC. Complete lethality and live fire testing plan. Coordinate test range infrastructure and upgrades to support EKV flight tests from KMR. Coordinate range instrumentation upgrades and provide data collection and analysis for NMD testing. Conduct target launch for IFT-3.	3 Capability Increment tof the NMD System sst results. Complete atte test range ide data collection and
- \$30,278	Sensor Technology: Deliver initial samples of advance 150K coolers. Extend cutoff wavelength of LWIR HgC control technology. Continue development, fabrication technologies for processors, memory, and analog-digita	Sensor Technology: Deliver initial samples of advanced optical coatings for testing. Initiate/continue endurance testing of the 35/60K, 60K, and 150K coolers. Extend cutoff wavelength of LWIR HgCdTe FPAs from current technology. Initiate optics development in contamination control technology. Continue development, fabrication, and test of advanced, radiation-hardened electronic components and packaging technologies for processors, memory, and analog-digital converters. Continue rad-hard visibile star tracker development.	of the 35/60K, 60K, and n contamination and packaging
- \$33,465	Program Support: Continue to provide management and assessment, cost estimating and analysis, budget analysis	Program Support: Continue to provide management and analysis support to the NMD program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.	lule/performance ement.
- \$13,975	Phenomenology: Provide AST core operating costs for distribute test data. Continue optical and radar data ana architectures to GBR, SMTS and GBI programs to hance	Phenomenology: Provide AST core operating costs for IFT-3 and core support to collect optical data to support NMD. Receive, archive and distribute test data. Continue optical and radar data analysis for NMD system design and test. Provide discrimination algorithms and architectures to GBR, SMTS and GBI programs to handle advanced threats and penaids. Validate modeling capabilities in the NMD scenario.	teceive, archive and orithms and in the NMD scenario.
- \$3,008	Architecture Analysis and BM/C3 Initiatives: Continue systems analysis work on NMD is emerging BM/C3 architectures and requirements in a synergistic manner across all NMD/ operational requirements to interoperable, affordable, evolvable, and supportable systems.	Architecture Analysis and BM/C3 Initiatives: Continue systems analysis work on NMD issues. Provide system-level capability to address emerging BM/C3 architectures and requirements in a synergistic manner across all NMD/TMD efforts and facilitate the translation of operational requirements to interoperable, affordable, evolvable, and supportable systems.	ability to address ranslation of
\$688	Threat and Countermeasures: Provide NMDSTA and operational threat environment intelligence estim system scenario descriptions, and upgrade threat modeling capability and digital media threat products.	Threat and Countermeasures: Provide NMDSTA and operational threat environment intelligence estimates, continue development of threat system scenario descriptions, and upgrade threat modeling capability and digital media threat products.	elopment of threat
- \$22,308	Andeling and Simulations: Provide infrastructure and core capability funding for the JNTF for hat other capabilities for system support, and supercomputing and wargaming resources. Provide sursimulators, and upgrade all computer capabilities. Provide M/S support in the five primary areas.	Modeling and Simulations: Provide infrastructure and core capability funding for the JNTF for hardware, software, and systems engineering, and other capabilities for system support, and supercomputing and wargaming resources. Provide supercomputing resources at the ARC/SC, validate simulators, and upgrade all computer capabilities. Provide M/S support in the five primary areas.	ystems engineering, and at the ARC/SC, validate
Project 2400	Page	Page 12 of 26 Pages Exhibit R-2 (PE 0603871C)	0603871C)





RD	RDT&E BUDGET ITEM JUSTIFICATIO	JUSTIFICATION SHEET (R-2 Exhibit)	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	and Validation	PE NUMBER AND TITLE 0603871C National Missile Defense	PROJECT 2400
- \$11,244	Test Resources: Provide ground test facility infrastruct tunnel testing at Tunnel 9, shock-tunnel testing at AOE lethality tests at AEDC Range G, sensor testing at POS AMOR and KHILS, and primary IR and blackbody cal EKV testing. Provide range instrumentation, upgrades	Test Resources: Provide ground test facility infrastructure and upgrades for BMDO testing including: IR sensor HWIL testing at KHILS, wind tunnel testing at ADEC, hover test capability at NHTF, command/control technology experiments at CERES, lethality tests at AEDC Range G, sensor testing at POST, CALM NRaD, and 7V/10V phenomenology characterization and target signatures at AMOR and KHILS, and primary IR and blackbody calibration standards at the NIST. Provide test range infrastructure and upgrades to support EKV testing. Provide range instrumentation, upgrades, data collection, and analysis for BMDO testing. Provide data collection and processing.	ing at KHILS, wind reriments at CERES, I target signatures at d upgrades to support ction and processing.
- \$32,219	Operational Support: Continue providing management and support for overhead/indirect fixed costs.	and support for overhead/indirect fixed costs.	
- \$504,091	Total		
FY 1999 (\$ in Thousands): - \$12,141 GBR: progr	sands): GBR: Participate in IFT-4 and the NMD integrated sys program.	<u>unds)</u> : GBR: Participate in IFT-4 and the NMD integrated system test (IFT-5) with GBR-P in-line. Continue algorithm development. Develop P3I program.	ent. Develop P31
- \$8,983	UEWR: Continue the conduct of real-time missile trac Demonstrator for participation in NMD integrated syst management activities.	UEWR: Continue the conduct of real-time missile tracking experiments using EWR and other applicable existing sensors. Provide UEWR Demonstrator for participation in NMD integrated system tests. Continue Upgraded EWR PDRR phase development and LSI contract management activities.	Provide UEWR LSI contract
- \$77,685	GBI: Participate in IFT-4 and the NMD integrated syst incorporating technology improvements and lessons le booster development and prepare for two propulsion velectronics. Continue radiation hardened microprocess operability in center 32x32 detectors of SHIELD focal ground plane for EKV.	GBI: Participate in IFT-4 and the NMD integrated system test (IFT-5) using EKV. Fabricate EKV for fourth intercept flight (IFT-6), incorporating technology improvements and lessons learned from IFTs 1-4. Acquire PLV hardware to support IFT-6. Continue dedicated booster development and prepare for two propulsion verification tests in FY00. Deliver flight ready SHIELD and PET FPAs and readout electronics. Continue radiation hardened microprocessor, low power analog-to-digital converter, and memory development. Demonstrate 100% operability in center 32x32 detectors of SHIELD focal plane array. Fabricate and test full-scale advanced composite structure with integral ground plane for EKV.	ht (IFT-6), ntinue dedicated As and readout nt. Demonstrate 100% ture with integral
- \$35,920	BM/C3: Conduct BM/C3 engineering and integration prototype development and NMD system integration a integrated with current increments of other BM/C3 confifth BM/C3 Prototype Capability Increment. Support IFT-4 and IFT-5.	BM/C3: Conduct BM/C3 engineering and integration activities to support BM/C3 Prototype development, BM/C3 communications component prototype development and NMD system integration activities. Complete development of the fourth increment of the BM/C3 Prototype, fully integrated with current increments of other BM/C3 components and with applicable external systems. Start and complete development of the fifth BM/C3 Prototype Capability Increment. Support NMD tests by providing integrated BM/C3 products as test articles. Support IGT-2A, IFT-4 and IFT-5.	unications component /C3 Prototype, fully development of the Support IGT-2A,
			(),
Project 2400	I UK	rake 13 of 20 rakes	U0U387 1C)

R	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) PATE February 1997	26
BUDGET ACTIVITY 4 - Demonstratio	PE NUMBER AND TITLE 0603871C National Missile Defense	PROJECT 2400
- \$35,559	System Engineering: Assess and refine user requirements based on updated Capstone ORD/CRD and CONOPS against system requirements. Finalize interface and configuration control requirements in support of deployment. Continue to analyze and update contingency deployment planning. Analyze and validate results of IFT-5 and IGT-2A. Support preparations for IFT-6 and IGT-3. Support the NMD Early Deployment Readiness Review in 4th quarter. Update technical documentation (NMD Capability Assessment, NMM, NSEN/IDN) and INTF system simulations based on test results to date.	nts. ment yment
- \$22,336	NMD Integration: Conduct FY99 NMD integrated system test (IFT-5) and support the NMD Early Deployment Readiness Review.	
- \$7,758	Deployment Planning: Refine the NMD Integrated Deployment Plan and the NMD Site Activation Plan to reflect programmatic changes and refinements to the NMD architecture. Prepare deployment assessment for the NMD Early Deployment Readiness Review. Assessment will include all aspects of deployment (industrial base assessment, operational suitability assessment, deployment risk analysis and site activation summary). Complete tactical site design to support deployment review and meet deployment timelines. Update program and deployment schedule information and refine critical path analysis of the NMD system.	and will tion tt
- \$52,538	Test and Evaluation: Support five month long IGT-2A campaign. Maintain currency of TEMP, CARD and Test Strategy with support of the NMD System T&E PIPT. Complete program documentation, pre-launch preparations and oversee execution of IFT-4 and IFT-5. Evaluate post-test results. Complete VV&A of IFT-4 and IFT-5 targets and fully accredit the ISTC. Implement lethality and live fire testing plan. Coordinate test range infrastructure and upgrades to support EKV flight tests from KMR. Coordinate test range instrumentation upgrades and provide data collection and analysis for NMD testing. Conduct target launches for IFT-4 and IFT-5.	the ate post- ordinate
- \$32,316	Sensor Technology: Deliver final samples of advanced optical coatings for testing. Deliver 2 lots of LWIR HgCdTe FPAs with extended wavelength cutoff. Initiate silicon FPA development to very long wavelength regime. Initiate continuous 10K sorption cooler effort. Continue endurance testing on 150K, 60K, and 35/60K PSC cryocoolers. Deliver prototype contamination control device. Initiate silicon carbide telescope effort. Continue development, fabrication, and test of advanced, radiation-hardened electronic components and packaging technologies for processors, memory and analog-digital converters. Deliver prototype non-cryogenic FPA signal processor. Continue rad-hard visible star tracker effort. Deliver rad-hard electrically erasable programmable read-only memory (EEPROM). Provide predicted and exploited signature data for test planning and systems effectiveness tasks.	d ontinue d-hard iploited
- \$24,704	Program Support: Continue to provide management and analysis support to the NMD program in areas such as cost/schedule/performance assessment, cost estimating and analysis, budget analysis and formulation, program planning and control, contract management.	မွ
Project 2400	Page 14 of 26 Pages Exhibit R-2 (PE 0603871C)	

	RD.	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhibit)	E February 1997
BUDGE 4 - De	BUDGET ACTIVITY 4 - Demonstration	BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C National Missile Defense	PROJECT 2400
1	\$13,529	ovide AST cal and radar	Phenomenology: Provide AST core operating costs for IFT-4 and IFT-5 missions to collect optical data. Receive, archive and distribute test data. Continue optical and radar data analysis for NMD system design and test. Provide discrimination algorithms and architectures to GBR, SMTS and GBI programs to handle advanced threats and penaids. Continue delivering validated signature models for high priority engagement scenarios.	rchive and distribute test and architectures to GBR, for high priority engagement
l	\$2,973	Architecture Analysis and BM/C3 Initiatives: Continue systems analysis work on NMD is emerging BM/C3 architectures and requirements in a synergistic manner across all NMD/operational requirements to interoperable, affordable, evolvable, and supportable systems.	Architecture Analysis and BM/C3 Initiatives: Continue systems analysis work on NMD issues. Provide system-level capability to address emerging BM/C3 architectures and requirements in a synergistic manner across all NMD/TMD efforts and facilitate the translation of operational requirements to interoperable, affordable, evolvable, and supportable systems.	el capability to address the translation of
l	\$657	Threat and Countermeasures: Provide NMDSTA and operational threat environment intelligence estim system scenario descriptions, and upgrade threat modeling capability and digital media threat products.	Threat and Countermeasures: Provide NMDSTA and operational threat environment intelligence estimates, continue development of threat system scenario descriptions, and upgrade threat modeling capability and digital media threat products.	e development of threat
†	\$22,535	Modeling and Simulations: Provide infrastructure and core capability funding for the JNTF for ha other capabilities for system support, and supercomputing and wargaming resources. Provide supsimulators, and upgrade all computer capabilities. Provide M/S support in the five primary areas.	Modeling and Simulations: Provide infrastructure and core capability funding for the JNTF for hardware, software, and systems engineering, and other capabilities for system support, and supercomputing and wargaming resources. Provide supercomputing resources at the ARC/SC, validate simulators, and upgrade all computer capabilities. Provide M/S support in the five primary areas.	and systems engineering, and nrces at the ARC/SC, validate
l	\$11,108	Test Resources: Provide ground test facility infrastructure and upgrades for tunnel testing at Tunnel 9, shock-tunnel testing at AQEC, hover test capable lethality tests at AEDC Range G, sensor testing at POST CALM, NRaD, an AMOR and KHILS, and primary IR and blackbody calibration standards a EKV testing. Provide core support for KMRSS. Provide range instrument Provide data collection and processing by the HALO with the IRIS sensor.	Test Resources: Provide ground test facility infrastructure and upgrades for BMDO testing including: IR sensor HWIL testing at KHILS, wind tunnel testing at Tunnel 9, shock-tunnel testing at AQEC, hover test capability at NHTF, command/control technology experiments at CERES, lethality tests at AEDC Range G, sensor testing at POST CALM, NRaD, and 7V/10/V, phenomenology characterization and target signatures at AMOR and KHILS, and primary IR and blackbody calibration standards at the NIST. Provide test range infrastructure and upgrades to support EKV testing. Provide core support for KMRSS. Provide range instrumentation, upgrades, data collection, and analysis for BMDO testing. Provide data collection and processing by the HALO with the IRIS sensor.	VIL testing at KHILS, wind ggy experiments at CERES, ation and target signatures at ture and upgrades to support lysis for BMDO testing.
1	. \$32,343	Operational Support: Continue providing management and support for overhead/indirect fixed costs.	and support for overhead/indirect fixed costs.	
1	. \$393,085	Total		
Acı	quisition Strategy:	. The NMD program is in a deployment readiness posture	Acquisition Strategy: The NMD program is in a deployment readiness posture that involves developing hardware that will be used in a FY99 integrated system test	Y99 integrated system test

(IFT-5) intended to demonstrate a National Missile Defense capability. The acquisition strategy is to use current NMD element contractors to complete the development of NMD elements necessary to accomplish this FY99 test, and to award a lead system integrator (LSI) contract in FY98. In addition, contract strategies are being implemented that will allow for fielding and maintaining an initial NMD system by FY03. Program risk is being reduced by performing the maximum number of system level tests between FY00 and FY03. NMD system performance beyond FY03 will be improved through technology upgrades and the addition of SBIRS Low.

B. Program Change Summary (\$\sumshipse \text{Thousands})

Project 2400

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Exhibit R-2 (PE 0603871C)

RDT&E BUDGET ITEM J		USTIFICATION SHEET (R-2 Exhibit)	R-2 Exhil	jį (DATE FAN	Fohriism, 4007	
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603871C National Missile Defense	National M	lissile De	fense		PR PR 24	23.1 PROJECT 2400
Previous President's Budget Appropriated Value	<u>FY 1996</u> 720,750	FY 1997 508,437 833,437	EY 1998 511,495	EY 1999 413,061		Total <u>Cost</u> 2,153,743		
Acquainteria to Appropriated Value: a. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	730,656	-4,573 828,864	504,091	393,085		2,456,696		
Change Summary Explanation: Funding: Additional resources have been all Schedule: N/A Technical: N/A	een allocated to the NMI	located to the NMD program as a result of the FY97 Congressional appropriation.	of the FY97 C	ongressional	appropriati	ou.		
C. Other Program Funding Summary (\$ in Thousands)	(spu							
PE 0603871C NMD MILCON Design	FY 1996 FY 1997 1	FY 1998 FY 1999 540 12,815	FY 2000	FY 2001	FY 2002 0	FY 2003 0	To Compl	Total Cost 13,355
D. Schedule Profile								
1 ilestones	FY 1996 2 3 4	EX 1997 1 2 3	4	FY 1998 2 3	% 4	1 2	FY 1999 2 3	4
a. GBR-P PDR b. NMD SRR c. GBR-P CDR d. NMD PDR e. NMD IPR f. NMD Early Deployment Readiness Review	×	× ××		×	M			×
Project 2400	Pa	Page 16 of 26 Pages			Exhibit	Exhibit R-2 (PE 0603871C)	03871C)	

RDT&E BUDGET ITEM JUSTIFIC	JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603871C National Missile Defense	Missile Defense	P. 2.	РКОЈЕСТ 2400
FY 1996	FY 1997 1 2 3 4 1	$\frac{\text{FY } 1998}{2}$ 4	FY 1999 1 2 3	4
			× × × ×	××
Contract Milestones x. GBR-P Contract Mod Implemented y. UEWR Demonstrator Contract Award z. NMD Lead System Integrator Concept Definition RFP Release aa. NMD Lead System Integrator Concept Definition Contract Awards bb. NMD Lead System Integrator Contract Awards cc. EKV Contractor Downselect	× ×			
Project 2400	Page 17 of 26 Pages	Exhibi	Exhibit R-2 (PE 0603871C)	

RDT&	E PROG	RAM EL	EMENT/F	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST B	REAKD(JWN (R-	3)	DATE Fe	February 1997	7
BUDGET ACTIVITY 4 - Demonstration and Validation	on and Val	idation			PE NUMBER 060387	PE NUMBER AND TITLE 0603871C Nation	PENUMBER AND TITLE 0603871C National Missile Defense	Defense		PR 24	PROJECT 2400
A. Project Cost Breakdown (\$ in Thousands)	kdown (S in I	(spusands)									
				FY 1996		FY 1997	FY 1998	FY 1999			
NMD Integration				0		58,046	7,085	22,336			-
Ground Based Interceptor	tor			259,764	7	236,319	127,551	77,685			
Battle Management, Command, Control and Communications	ommand, Con	trol and Com	nunications	72,160		50,576	43,730	35,920			
Ground Based Kadar	Dodon			87,000		66,129	19,536	12,141			
Systems Engineering	ig Nauais			56,038		12,122 42.542	10,745	35,559			
Deployment Planning				11,475		17,139	16,613	7,758			
Program Support				20,902		31,100	33,465	24,704			
Test and Evaluation				70,385		101,599	83,705	52,538			
Sensor Technology				87,806		54,134	30,278	32,316			
Other NMD Initiatives				0		52,945	0	0			
Phenomenology				18,741	-	19,587	13,975	13,529			
Architecture Analysis/BMC3 Initiatives	3MC3 Initiativ	es		3,051		1,989	3,008	2,973			
Threat and Countermeasures	sures			7,945	•	7,168	889	657			
Modeling and Simulation	uo			16,041		32,803	22,308	22,535			
Test Resources				10,858		11,554	11,244	11,108			
Operational Support Total				0 730,656	8	33,112 828,864	32,219 504,091	32,343 393,085			- 127
B. Budget Acquisition History and Planning Information	History and	Planning Inf	ormation (\$ i	n (\$ in Thousands)							
Performing Organizations:	tions:										
Contractor or Co	Contract	A word or	Derforming	Droice	T.						
	or Funding Vehicle	Obligation Date	Activity EAC	office EAC	Prior to	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Project 2400				Pag	Page 18 of 26 Pages	São		п	Evhihit R-3 (DE 06038710)	06038710)	
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RD	RDT&E PROGRAM ELEME	SRAM EL		NT/PROJECT		REAKD(COST BREAKDOWN (R-3)	3)	DATE F e	February 1997	197
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation			PE NUMBER ANI 0603871C	PE NUMBER AND TITLE 0603871C Nation	TITLE National Missile Defense) Defense		LN	РВОЈЕСТ 2400
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office <u>EAC</u>	Total Prior to FY 1996	Budget FY 1996	Budget FX 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total <u>Program</u>
Product Development Organizations	ent Organizations	ν _λ ι									
NMD											
TBD	TBD	FY97	250,000	250,000		0	58,046	7,085	22,336	continues	87,467
GBI			• .								
Hughes	CPFF	06/6				75,916	82,974	0	0	continues	158,890
Rockwell	CPFF	06/6				75,056	85,150	0	0	continues	160,206
TBD (EKV)	CPFF	FY98				0	0	20,310	6,064		26,374
Lockheed	CPIF	1/86		•		59,792	37,000	35,000	25,000	continues	156,792
NRC	CPAF	3/92				6,487	6,685	0	0		13,172
Sparta	CPFF	8/92				1,790	1,667	0	0		3,457
ASGI	CPFF	68/9				1,307	0	0	0		1,307
Mevatec	CPFF	11/93				1,045	0	0	0	;	1,045
SY Technology	CPFF	10/96				0 0	2,290	2,620	2,101	continues	7,011
TBD (GBI prime)	CPFF	1BD 9/90	26.625	26.625		2.300		43,000	6,5,07	continues	2,300
Liris (PET)	CPFF	06/6	25,425	25,425		2,300	0	0	0		2,300
TBD (PET)	CPFF	1/97				0	3,000	3,000	3,000	continues	000,6
Rockwell	CPFF	11/92	6,580	6,580		1,920	2,310	0	0	continues	4,230
(SHLD)		9		7			ć	Ċ	(
IKW	Crrr	30/0	1,767	1,707		1,437					1,437
Miss contracts	CFF.	06/K	616,1	61.61		15.814	356	9 473	1.162	continues	31,102
CEAE MD	V/N	N/A				13,27	9 887	12 148	11 985	continues	47 408
SFAE-MD	4						100,50	2,1	20741		
Project 2400				Pa	Page 19 of 26 Pages	iges		EXT	Exhibit R-3 (PE 0603871C)	0603871C)	
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RD.	RDT&E PROGRAM ELEMEN	SRAM EL		T/PROJECT	COST	REAKD(BREAKDOWN (R-3)	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation			PE NUMBE 060387	PE NUMBER AND TITLE 0603871C Nation	PE NUMBER AND TITLE 0603871C National Missile Defense	Defense		2	PROJЕСТ 2400
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total <u>Program</u>
BM/C3											
TRW	CPFF CPAF	8/24/95 12/27/94	90,550 27,350	90,550 27,350		42,049 6,250	18,759	18,790 5,200	16,057	continues	95,655
SFAE-MD	N/A A/A	N/A A/A				2,521	2,691	2,600	1,900	continues	9,712
TBE	CPFF	4/24/97	4,100	4,100		0	1,000	1,100	006	continues	3,000
Mitre	FFRDC	Annual 10/1/94	11,724	11,724		2,529	2,800	2,880 825	2,110	continues	10,319
TRW	CPAF	2/1/95	13,500	13,500		2,395	3,500	2,272	1,736	continues	9,903
Loral NSWC	CPAF N/A	2/1/95 N/A	7,900	7,900		1,290	1,660	1,113	824	continues	4,887
Misc Contracts	N/A	N/A				11,780	10,166	8,650	7,639	continues	38,235
GBR											
Raytheon TBE Colsa	CPAF CPAF CPFF	11/94 3/92 6/89	148,922	148,922		62,022 2,476 3,430	58,598 1,000 0	15,100 0 0	9,697 0 0	continues	145,417 3,476 3,430
GRA Misc contracts SFAE-MD	CPFF N/A N/A	7/96 N/A N/A		-		1,100 2,235 15,737	0 1,831 4,700	0 1,936 2,500	0 944 1,500	continues	1,100 6,946 24,437
UEWR											
Xontech TBD	CPAF	1/3/95 12/1/97	12,600	12,600		4,367	6,429	011,735	4,583	continues	10,796
Project 2400	W/A1	Whi		Pa	Page 20 of 26 Pages		000,1	L,300 Exh	continues Exhibit R-3 (PE 0603871C)	continues 0603871C)	5,200

BUDGET ACTIVITY 4 - Demonstration and Validation Contractor or Contract Government Method/Type Award or Performing or Funding Obligatio Activity Vehicle Date Mitte										
actor or nment ming ty	nd Validation			PE NUMBER AN 0603871C	PE NUMBER AND TITLE 0603871C Nation	D TITLE National Missile Defense	Defense		P 2	РРОЈЕСТ 2400
SENSOR TECH	Contract Method/Type Award or or Funding Obligation Vehicle Date FFRDC	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996 1,900 923	Budget FY 1997 3,000 1,393	Budget FY 1998 3,360 350	Budget <u>FY 1999</u> 3,100 0	Budget to Complete continues	Total <u>Program</u> 11,360 2,666
Hughes CPFF	1/90	8,770	8,770		1,950	1,600	0	0		3,550
Analog Devices CPFF	1/91 Ten	9,710	9,710		1,300	1,160	1,100 2,890	718 3 590	continues	4,278
TRD CPFF	TBD	17.700	17,700		0	5,000	11,582	8,285	continues	24,867
	TBD	8,100	8,100		0	1,000	2,890	2,761	continues	6,651
ps Lab	N/A				1,140	260	1,500	1,000	continues	3,900
:	3/30/90	1,490	1,490		1,290	0 000 1	0	00		1,290
Lockheed Martin CPAF	1/10/96	1,630	1,630		2,210	925	800	800	continues	4,735
well	1/90		•		1,120	925	800	800	continues	3,645
	2/93	6,620	6,620		1,470	0	0	0		1,470
Rockwell CPAF	2/93	0,670	6,670		2,030	0	0	0		2,030
Xontech					1,400	0	0	0		1,400
	N/A			,	1,600	0	0	0		1,600
JHU/APL CPFF	10/1/91	165,841	_		11,644	0	0	0		11,644
JHU/APL(B) CPFF	4/1/95	39,894			7,000	9,938	0	0		16,938
_	1/2/92	53,169			1,350	0	0	0		1,350
	6/15/88	90,586			6,852	1,635	0 0	0 0		8,487
DPC)	8/7/92	20,800	70,800		4,403	3,390	0			666,1
	12/1/93				7,527	1,02,1	0			0,004
Misc NASA MIPR	N/A				233	598	o '	o '		831
ည	N/A				4,241	580	0	0		4,821
AFSMC N/A	N/A				10,831	8,509	0	0		19,340
	N/A				2,309	2,300	0	0	;	4,609
USASSDC N/A	N/A				1,556	1,161	1,223	1,223	continues	5,163
JHU/APL CPAF	96/9	17,000	17,000		5,230	950	0	0		6,180
Project 2400			Pa_{i}	Page 21 of 26 Pages	ıges		Ext	Exhibit R-3 (PE 0603871C)	0603871C)	

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8	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	PAM EL	EMENT/P	ROJECT	COST B	REAKDO	WN (R-	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Va	lidation			PE NUMBER AND TITLE 0603871C Nation	AND TITLE	PE NUMBER AND TITLE 0603871C National Missile Defense	Defense		2 2	PROJECT 2400
Contractor or Government Performing Activity Misc Contracts	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Office EAC	Total Prior to FY 1996	Budget FY 1996 10,983	Budget FY 1997 10,370	Budget EY 1998 7,318	Budget FY 1992 13,139	Budget to Complete continues	Total Program 41,810
OTHER NMD INITIATIVES											
TBD	TBD	TBD				0	52,945	0	0		52,945
Support and Management Organizations	gement Organiza	ions									
SYSTEM ENGINEERING											
TRW	CPFF	8/95				38,833	25,605	25,004	25,568	continues	115,010
BDM USSPACECOM	CPAF	12/2//94 N/A				1,855	7,107	7,107	7,107	continues	29,176
JNTF	N/A	N/A				3,100	3,300	3,300	1,212	continues	10,912
DNA	MIPR	N/A				1,750	1,750	1,750	0	;	5,250
AFSPACE	K X X	ς Υ X X				200	280 200	280 200	318 189	continues	1.689
USAF/SMC	N/A	N/A				1,500	2,000	2,000	450	continues	5,950
NAVSPACE	N/A	N/A				200	200	200	79	continues	1,579
DEPLOYMENT PLANNING				-							
TRW	CPFF	8/23/95				2,458	5,000	6,500	4,157	continues	18,115
NIST	MIPR	N/A				492	450	450	875	continues	2,267
SFAE-MD	Y/Z	N/A				3,130	762	0	0		3,892
USAF/SMC	N/A	V/V				200	230	510	520	continues	1,760
USSPACECOM	K/N	Y /Z				971	1,500	1,289	543	continues	4,303
Project 2400				Pa	Page 22 of 26 Pages	ges		Exh	Exhibit R-3 (PE 0603871C)	0603871C)	



RD	RDT&E PROGRAM ELEME	SRAM EL		NT/PROJECT COST BREAKDOWN (R-3)	COST B	REAKDO	WN (R-	3	DATE Fe	February 1997	766
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Val	lidation			PE NUMBER AND TITLE 0603871C Nation	AND TITLE	PE NUMBER AND TITLE 0603871C National Missile Defense	Defense			РВОЈЕСТ 2400
Contractor or Government Performing Activity TBD USA Corp of Eng TBD	Contract Method/Type or Funding Vehicle CPFF N/A CPFF N/A	Award or Obligation <u>Date</u> FY97 N/A FY97	Performing Activity <u>EAC</u>	Project Office <u>EAC</u>	Total Prior to F <u>Y 1996</u>	Budget FY 1996 0 0 0 3,924	Budget EY 1997 2,110 4,100 990 1,997	Budget E <u>Y 1998</u> 2,610 1,750 1,000 2,504	Budget F <u>Y 1999</u> 1,500 0 0	Budget to Complete continues	Total Program 6,220 5,850 1,990 8,588
PROGRAM SUPPORT BDM SFAE-MD USASSDC	CPAF N/A N/A	12/27/94 N/A N/A				20,902 0 0	19,103 8,684 3,313	11,770 18,390 3,305	5,699 15,704 3,301	continues continues continues	57,474 42,778 9,919
PHENOMEN- OLOGY Boeing MIT/LL Xontech USASSDC Misc contracts	CPFF FFRDC CPFF N/A N/A	9/95 10/95 10/96 N/A N/A		•		3,049 5,443 1,666 512 8,071	3,238 5,410 1,667 658 8,614	3,406 1,902 0 590 8,077	3,418 1,658 0 590 7,863	continues continues continues continues	13,111 14,413 3,333 2,350 32,625
ARCH ANALYSIS BDM Misc contracts	CPAF	12/27/94				1,070	600	1,070	1,040	continues	3,780
THREAT & CM Sandia Project 2400	N/A	N/A		Pag	Page 23 of 26 Pages	1,300 ges	1,200	0 Exhi	0 Exhibit R-3 (PE 0603871C)	0603871C)	2,500

RD	RDT&E PROGRAM ELEME	SRAM EL		NT/PROJECT	COST B	REAKDO	COST BREAKDOWN (R-3)	S	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ition and Va	lidation			PE NUMBER AND TITLE 0603871C Nation	AND TITLE	PE NUMBER AND TITLE 0603871C National Missile Defense	Defense		2	PROJECT 2400
Contractor or Government Performing Activity MIT/LL OGAs Misc contracts	Contract Method/Type or Funding Vehicle FFRDC N/A	Award or Obligation Date N/A N/A	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget EY 1996 2,500 949 3,196	Budget FY 1997 1,300 1,046 3,622	Budget FY 1998 0 390 298	Budget FY 1999 0 373 284	Budget to Complete continues	Total Program 3,800 2,758 7,400
OPERATIONAL SUPPORT Misc operational accounts						0	33,112	32,219	32,343	continues	97,674
Test and Evaluation Organizations	Organizations										
TBE Colsa	CPAF CPFF	3/92 6/89				7,047	4,000	2,000	1,200	continues	13,047
Colsa Rockwell Hughes	CPFF CPFF	06/6 06/6				4,100 2,200 2,000	13,700 2,200 2,200	13,300 2,000 2,200	5,659 0 0	continues	36,759 6,400 6,400
SMC SFAE-MD	N/A N/A	N/A N/A				1,800 5,900	3,400	2,600	2,700 1,720	continues continues	10,500
USASSDC JNTF	N/A N/A	N/A N/A N/A				455 0	14,121 600	15,664 1,580	9,764	continues	40,004
Misc contracts GRI Targets:	N/A	N/A N/A				0 4,303	100 13,412	15,949	120 6,553	continues	320 40,217
USASSDC Sandia SMC Lockheed	N/A N/A N/A	N/A N/A N/A				339 10,062 7,152 6.988	640 10,118 1,398 18.214	535 10,093 1,750	1,460 10,002 1,700 9,115	continues continues continues	2,974 40,275 12,000
Project 2400				Pag	Page 24 of 26 Pages			Exhi	Exhibit R-3 (PE 0603871C)	0603871C)	700'1

RD	RDT&E PROGRAM ELEME	RAM EL		NT/PROJECT	COST BREAKDOWN (R-3)	REAKDO	WN (R-	E C	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Val	lidation			PE NUMBER AND TITLE 0603871C Natic	AND TITLE C Nation	DE NUMBER AND TITLE OG03871C National Missile Defense	Defense		P 2	PROJECT 2400
Contractor or Government Performing Activity Sy Technology TBE	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget EY 1996 0 722	Budget EY 1997 625 455 1,300	Budget F <u>Y 1998</u> 750 720 340	Budget F <u>Y 1999</u> 625 620 1,300	Budget to Complete continues continues	Total Program 2,000 2,517 2,940
MSX Targets: USASSDC Sandia TBE MICOM SMC	N/A N/A N/A N/A	N/A N/A N/A				6,975 6,777 1,773 592 0	1,246 4,894 177 680 359	00000	0000		8,221 11,671 1,950 1,272 359
Modeling & Sim Colsa MRC USASSDC NRL AFSPACE TRW Loral Mitre JNTF BMDO				,		2,054 720 1,018 243 148 491 5,950 2,110 2,309 998	2,073 715 1,107 784 303 1,445 9,450 5,700 10,756 470	2,137 712 0 242 0 2,332 3,914 1,614 7,339 4,018	2,114 705 0 239 0 2,305 3,860 1,622 7,378 4,312	continues continues continues continues continues continues	8,378 2,852 2,125 1,508 451 6,573 23,174 11,046 27,782 9,798
TEST RESOURCES USASSDC Phillips Lab Wright Lab Det2-SMC Project 2400	N/A N/A N/A	X		Pa	Page 25 of 26 Pages	3,555 699 1,159 300 ges	1,875 950 931 300	2,908 1,000 1,000 300 Exh	3,266 1,000 1,000 300 iibit R-3 (PE	8 3,266 continues 0 1,000 continues 0 1,000 continues 0 300 continues Exhibit R-3 (PE 0603871C)	11,604 3,649 4,090 1,200

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RD1	RE PROG	RAM EL	EMENT/P	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3		DATE Fe	February 1997	760
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation	:		PE NUMBER AND TITLE 0603871C Nation	AND TITLE C Nation	ਮπਦ National Missile Defense	Defense			РRОЈЕСТ 2400
Contractor or Government Performing Activity NIST Arnold Engin. NSWC SPAWAR Misc contracts	Contract Method/Type or Funding Vehicle N/A N/A N/A N/A N/A	Award or Obligation Date N/A N/A N/A	Performing Activity <u>EAC</u>	Project Office EAC	Total Prior to EX 1996	Budget EY 1996 100 100 735 388 3,822	Budget FX 1997 100 2,250 727 412 4,009	Budget EY 1998 100 1,525 725 410 3,276	Budget EY 1999 100 1,525 716 406 2,795	Budget to Complete continues continues continues continues	Total Program 400 5,400 2,903 1,616
B. Budget Acquisition History and Planning Information Continued (\$\frac{1}{2}\$ in Thousands) Government Furnished Property: Contract Method/Type Award or Item or Funding Obligation Delivery Description Vehicle Date Date Prior 1 Prior 1 Product Development Property	ion History and shed Property: Contract Method/Type or Funding. Vehicle	LPlanning Inf Award or Obligation Date	ormation Con Delivery Date	utinued (S in Th	ousands) Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Support and Management Property Test and Evaluation Property Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation Total Project	ement Property Property velopment Management 'aluation			-	; ;	515,220 118,152 97,284 730,656	530,271 152,637 145,956 828,864	244,925 141,909 117,257 504,091	189,381 117,523 86,181 393,085		1,479,797 530,221 446,678 2,456,696
Project 2400				Pag	Page 26 of 26 Pages	es		Exh	bit R-3 (PE	Exhibit R-3 (PE 0603871C)	



	RDT&E BUDGET ITEM		JUSTIFICATION		HEET (R	SHEET (R-2 Exhibit)	bit)		DATE Fe	February 1997	766
8UDG 4 - 1	BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Join	тіт <u>ге</u> loint The	ater Miss	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ıse		
	COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	429,137	506,492	542,619	514,109	544,417	550,196	538,259	520,800	Continuing	Continuing
1155	Phenomonology Program	36,908	31,338	37,835	38,622	37,464	37,300	37,205	36,490	Continuing	Continuing
1161	Advanced Sensor Technology	1,270	3,334	3,364	3,208	3,199	3,151	3,148	3,153	Continuing	Continuing
1170	TMD Risk Reduction	41,521	23,184	35,267	25,045	24,920	24,803	24,773	24,817	Continuing	Continuing
1270	Applied Inert Mats and System Tech Program	9,137	0	0	0	0	0	0	0	ТВD	TBD
1294	UAVBoost Phase intercept	5,705	086	0	0	0	0	0	0	TBD	тво
2160	TMD Existing System Mods	20,401	22,421	12,328	12,957	0	0	0	0	TBD	TBD
2259	Israeli Cooperative Project	59,352	43,892	38,715	38,662	38,624	38,591	0	0	ТВО	TBD
3153	Architecture Analysis / BMC3I Initiatives	9,738	6,799	8,273	8,099	8,058	8,020	8,011	8,026	Continuing	Continuing
3157	Environmental, Siting, and Facilities	4,369	5,972	3,600	3,640	3,631	3,609	3,606	3,612	Continuing	Continuing
3160	TMD Readiness	1,112	1,709	1,730	1,692	1,687	1,676	1,674	1,677	Continuing	Continuing
3251	Systems Engineering and Technical Support	45,358	50,909	65,260	62,031	66,972	69,350	90,554	76,498	Continuing	Continuing
3261	TMD BM/C3I (BM/C3I Concepts)	0	32,357	34,094	35,864	43,717	44,576	43,210	43,286	Continuing	Continuing
3265	User Interface	15,286	14,031	14,680	21,976	22,060	22,113	22,048	22,118	Continuing	Continuing
3270	Threat and Countermeasures Program	19,865	21,419	27,986	29,154	27,981	27,891	28,779	27,898	Continuing	Continuing
3352	Modeling and Simulations	71,362	64,180	73,173	72,984	74,959	74,961	78,333	75,661	Continuing	Continuing
				Page 1 of 120 Pages	20 Pages			Exhib	Exhibit R-2 (PE 0603872C))603872C)	

RDT&E BUDGET ITEM	TEM JUS	TIFICA	TION SI	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fet	February 1997	F 76
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	PE NUMBER AND TITLE O603872C Joint Theater Missile Defense	ater Miss	ile Defen			
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	r Y 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3354 Targets Support	23,046	22,842	27,603	18,721	42,755	42,226	42,463	42,578	Continuing	Continuing
3359 System Test and Evaluation	33,568	42,792	40,307	26,444	30,263	32,250	31,590	31,636	Continuing	Continuing
3360 Test Resources	31,139	35,507	30,888	30,201	29,942	29,793	30,312	30,363	Continuing	Continuing
4000 Operational Support	0	82,876	87,516	84,809	88,185	89,886	92,553	92,987	Continuing	Continuing

ARCHITECTURE

A. Mission Description and Budget Item Justification

designed to protect the United States and its Allies against the immediate and growing threat from shorter range theater ballistic missiles. The TMD core programs are PATRIOT Advanced Capability (PAC)-3, Theater High Altitude Area Defense (THAAD) System, and Navy Area Theater Ballistic Missile Defense (TBMD) formerly The Theater Missile Defense (TMD) program's goal is to develop, maintain and deploy a cost-effective, Anti-Ballistic Missile (ABM) Treaty compliant system (Lower Tier) and Navy Theater-Wide TBMD formerly(Upper Tier).

supporting systems, components, and architectures that could produce highly effective defenses against theater missile threats. Includes manpower authorizations and Theater Missile Defense programs, projects, and activities in Advanced Development that have as a primary objective the development of technologies capable of the associated costs specifically identified and measured to the performance of these programs.

Defense policy. Further justification of the Budget Activity code assigned to each Program Element is contained within the Brief Description of Element section of This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of each Program Element Summary.

Acquisition Strategy: See Individual R2 summaries.

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Exhibit R-2 (PE 0603872C)



RDT&E BUDGET ITEM JUSTI	FICATION	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhib	it)	DATE Feb	February 1997	
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603872C Joint	וודנב oint Thea	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense			
B. Program Change Summary (\$ in Thousands)							
Previous President's Budget	FY 1996 421,185	FY 1997 520,111	FY 1998 557,046	<u>FY 1999</u> 515,855	Total <u>Cost</u> 2,014,197		
Appropriated Value Adjustments to Appropriated Value: a. MEADS below threshold reprogramming b. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	429,137	525,511 -14,125 -4,872 506,492	542,619	514,109	1,992,357		
Change Summary Explanation: See Individual R2 summaries. Funding: Schedule: Technical:							
C. Other Program Funding Summary (S in Thousands). See Individual R2 summaries.	e Individual	R2 summaries.					
FY 1996 F	EY 1997 E	FY 1998 FY 1999	FY 2000	FY 2001 FY 2	FY 2002 FY 2003	To Compl	Total Cost
D. Schedule Profile See Individual R2 summaries. FY 1996	•	EX 1997	-	FY 1998	-	FY 1992	-
	-	n N	.	n N	-	n	+
	Pay	Page 3 of 120 Pages			Exhibit R-2 (PE 0603872C)	503872C)	

RDT&E BUDGET ITEM	- 1	TIFICA	TION SI	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 000	PE NUMBER AND TITLE 0603872C Join(E NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ater Miss	ile Defen	se	P 1	РRОЈЕСТ 1155
COST (\$ in Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1155 Phenomonology Program	36,908	31,338	37,835	38,622	37,464	37,300	37,205	36,490	36,490 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

Infrared spectrums. This program evaluates and develops algorithms for the critical functions of discrimination, target handover, and aimpoint selection. This program adjunct to the evaluation of BMD system performance across the full spectrum of threats and engagement scenarios. This program provides data collection sensors and This project provides the U.S. with the data and predictive tools to generate high confidence target signatures for ballistic missile defenses (BMD). This is a critical instruments for use on live-fire missions and analysis of the resulting test data. This program provides predictive models of target signatures in both Radar and provides for data storage and retrieval of all ballistic missile defense office (BMDO) sponsored tests per statutory requirements.

Advanced Missile Signature Center (AMSC). The MDDC is the primary repository of THAAD data. Both the MDDC and AMSC meet the statutory requirements for Data Centers and Management. Storage, archival and retrieval of signature related data is provided by the BMDO-funded Missile Defense Data Center (MDDC) and program data archiving.

Mission costs for AST are provided by using acquisition programs. This project provided FY 96 termination costs for the COBRA EYE sensor. This project monitors Data Collection Platforms. This project provides core operating costs for Airborne Surveillance Testbed (AST) target signature collection sensor and platform. other BMDO signature data collection programs to ensure complete coverage and avoid duplication. Analysis, Algorithms, and Modeling. This project performs analysis of radar and optical data on ballistic missile threat signatures and intercept events for the THAAD Radar, THAAD interceptor, and Navy TMD programs. This project develops and evaluates discrimination and kill assessment algorithms for THAAD Radar. This project develops signature models and modeling tools applicable to TMD threat profiles and flight regimes leveraging off investments made in TMD modeling and modeling tools

characterizations of expected and unexpected target features. Under the guidance of the Target Signatures Working Group (TSWG) develop target models and provide algorithm development and evaluation. This includes TMD optical sensor data from THAAD, project 1170, project 3270, and others. This project provides post-flight For analysis this project provides accurate, objective, and timely flight data analysis in support of target signature phenomenology characterization and sensor discrimination, and handover algorithms against Dem/Val targets and UOES threats. Provide analysis and recommendations for TMD aimpoint selection, high fidelity signature sets of THAAD Dem/Val and User Operational Evaluation System UOES targets. Evaluate THAAD software aimpoint selection, discrimination, and sensor handover.

Project 1155

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Exhibit R-2 (PE 0603872C)



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	Exhibit) DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation 0603872C Joint	PROJECT 0603872C Joint Theater Missile Defense 1155
For THAAD Radar algorithms this project develops and analyzes algorithms that have the highest payoff potential for the critical functions of detection, tracking, bulk classification, typing, discrimination, target object map generation, aimpoint selection, and kill assessment. Maintenance and upgrades to the simulation facilities required to develop and evaluate these algorithms against real and simulated data is provided for. The Lexington Discrimination System (LDS) will be used to merge radar and optical data analysis on a real-time basis for algorithm development and assessment. Specific tasks include: (1) Use LDS to support development and evaluation of objective system algorithms to be installed on the THAAD Radar, THAAD Interceptor, and Navy TMD programs; (2) Use signature data to identify robust discriminants using field measurements; (3) Develop and deliver individual radar discrimination algorithms based on identified discriminants; (4) Develop, deliver, and exercise on the LDS, algorithms which utilize radar and optical data to facilitate seeker Target Object Map and aim-point selection for THAAD and other TMD systems; and (5) Complete the LDS real-time multiple-target handling capability and test TMD algorithms/architectures using this capability.	s and analyzes algorithms that have the highest payoff potential for the critical functions of detection, tracking, bulk map generation, aimpoint selection, and kill assessment. Maintenance and upgrades to the simulation facilities against real and simulated data is provided for. The Lexington Discrimination System (LDS) will be used to merge for algorithm development and assessment. Specific tasks include: (1) Use LDS to support development and talled on the THAAD Radar, THAAD Interceptor, and Navy TMD programs; (2) Use signature data to identify Develop and deliver individual radar discrimination algorithms based on identified discriminants; (4) Develop, a utilize radar and optical data to facilitate seeker Target Object Map and aim-point selection for THAAD and other multiple-target handling capability and test TMD algorithms/architectures using this capability.
For modeling this project provides high confidence, target and background scene predictions for sensors and BMD systems. These generated scenes are the foundation for high confidence simulations of engagements that cannot or will not be flight tested. The high-fidelity, physics-based models, predicted composite scenes, and associated analytic output developed in this task are evaluated against measured data to ensure confidence in simulation results and provide a reliable route to systems verification and validation. To facilitate this objective, this task also provides crucial data-driven software tools for exploiting measured data and integrating measurements with simulations in support of technology development, test and evaluation, and acquisition efforts.	iors and BMD systems. These generated scenes are the foundation elity, physics-based models, predicted composite scenes, and lence in simulation results and provide a reliable route to systems tware tools for exploiting measured data and integrating sition efforts.
This project also provides for participation in international technical exchange programs in the areas of optical and radar discrimination, reentry, and background and plume phenomenology include: U.S./U.K. Scientific Cooperation Research Exchange (SCORE); use of the UK MESAR Radar; NATO Extended Air Defense (EAD)/TMD Ad Hoc Working Group - Plume Phenomenology Expert Group (U.S., U.K., France, Canada); U.S./French Bilateral Group - Plumes, Backgrounds, and Reentry Signatures; U.S./Israeli TBM Signature and Phenomenology Research; and the U.S./German Phenomenology Research committee.	of optical and radar discrimination, reentry, and background and of the UK MESAR Radar; NATO Extended Air Defense anada); U.S./French Bilateral Group - Plumes, Backgrounds, and Phenomenology Research committee.
 FY 1996 (\$\$\frac{1}{8}\$ in Thousand\$\$\text{in Thousand}\$\$\text{in TMDC}\$ and AMSC. for required maintenance of hardware for MDDC and AMSC. Data Collection Platform: Provided AST core operating costs to continue optical data collection in support of THAAD flight tests, the TMD Critical Measurements Program (TCMP) campaign, Navy SM-2 Block IVA tests, Combined Experiment Program (CEP/CPX) and Hera target flights. Provided for COBRA JUDY mission planning to support THAAD intercept events, the TCMP campaign, WD, CEP/CPX, and Hera target flights. Provided for termination of COBRA EYE sensor system. 	stributed hardbody and plume target signature test data. Provided all data collection in support of THAAD flight tests, the TMD ts, Combined Experiment Program (CEP/CPX) and Hera target reept events, the TCMP campaign, WD, CEP/CPX, and Hera
Project 1155 Page 5 of 120 Pages	Exhibit R-2 (PE 0603872C)

RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense
- \$14,140 - \$36,908	Analysis, Algorithms, and Modeling: Developed, refined, and demonstrated active and passive algorithm architectures of multiple targets and single sensors on LDS prototype. Developed multi-sensor data fusion algorithms which perform efficient data resource allocation. Updated integrated background and weather code to include cloud, terrain and UV to RF coverage for modeling and simulation of radar propagation, IR, visible, and laser models. Used LDS to develop and evaluate real-time algorithms for tumbling targets and high resolution imaging in support of THAAD Radar. Performed statistical evaluation of radar/optical discrimination algorithms using field test data. Continued simulation/analysis of TMD Dem/Val optical discrimination and aimpoint algorithms, and finalize prototype algorithms (target selection, aimpoint selection, and kill assessment). Continued to analyze Dem/Val data to support TMD algorithms development. Completed and distribute atmospheric clutter models to TMD system designers. Upgraded signature modeling to incorporate additional TMD threats, modeling of re-entry hardbody break-up, aomelated radar-IR ground clutter and capability to merge data with simulations. Developed integrated handover/discrimination information for aimpoint selection using interceptor seeker and integrated radar hardbody and plume signatures for early detection of theater ballistic missiles (TBMs). Developed and provide new release of optical signature modeling with improvements to support optical discrimination algorithms for NMD and TMD intercept capability. Continued participation in international technical exchange programs (U.S./U.K. Scientific Cooperative Research Exchange (SCORE) Program - Target Signatures & Backgrounds Panel and Trials Group, NATO Extended Air Defense (EAD/TMD Backgrounds, and Reentry Signatures, U.S./Israeli TBM Signature phenomenology Research, U.S./German Phenomenology Research) in the areas of optical and radar discrimination, reentry, and signature phenomenology.
EY 1997 (\$ in Thousands): - \$5,310 Data data a - \$9,857 Data PAC - \$16,171 Analicapal Missi time targe Delivi in the	Data Centers and Management: MDDC and AMSC will receive, archive, and distribute missile signature test data. Provide required upgrades to data storage and handling tools. Data Collection Platform: Provide AST core operating costs for continued optical data acquisition of THAAD flight tests, Navy TMD trafts, PAC-3 tests, and Willow Dune, TCMP tests. Analysis, Algorithms, and Modeling: Continue radar and optical data analysis support for developmental TMD systems. Increase the capabilities of the LDS to include a scenario visualization tool, an interceptor engagement simulation, and incorporate data into the LDS Field Mission Data Base. Upgrade the LDS physical plant to include upgraded memory and rapid prototyping environments. Complete the LDS real-time multiple target handling capability. Develop and analyze higher order discrimination algorithms using LDS. Upgrade modeling of radar target signatures. Integrate laser signature modeling into the composite modeling framework for radar and infrared signature representations. Deliver validated signature models for high priority engagement scenarios. Continue participation in international technical exchange programs in the areas of optical and radar discrimination, reentry, and background and plume battlespace environment.
Project 1155	Page 6 of 120 Pages

RD	RDT&E BUDGET ITEM JUSTIFICATIO	JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	n and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	PROJECT ense 1155
FY 1998 (\$ in Thousands): - \$4,695 Data data a - \$16,585 Data - \$16,555 Anal	Centers & Management: storage and handling tools Collection Platform: Provysis, Algorithms, and Mocyoptical discrimination alg	MDDC and AMSC will receive, archive, and distribute missile signature test data. Provide required upgrades to ide AST core operating costs to collect optical data of TMD target development flights and intercepts. leling: Continue data analysis support for TMD systems in Dem/Val and EMD. Provide support for TMD continus and architectures for advanced TMD threats and penaids. Develop real-time algorithms for battlefield for the sensor resource allocation to support	data. Provide required upgrades to ent flights and intercepts. D. Provide support for TMD al-time algorithms for battlefield by resource allocation to support
threa threa inter - \$37,835 Total FY 1999 (\$ in Thousands): - \$6,256 Data	tradaptive algorithm archinational technical exchang	tectures. Deliver validated signature models for high priority engagement scenarios. Continue participation in the programs in the areas of optical and radar discrimination, reentry, and signature phenomenology. MDDC and AMSC will receive, archive, and distribute missile signature test data. Provide required upgrades to	narios. Continue participation in ature phenomenology.
- \$16,557	data storage and handling tools. Data Collection Platform: Provide AST core operating costs to collect optical data of TMD target development flights and intercepts (i.e., THAAD DT, PAC-3 test, etc.) Analysis, Algorithms, and Modeling: Continue data analysis support for TMD systems in Dem/Val and EMD. Continue demonstration of	ride AST core operating costs to collect optical data of TMD target development flights and intercepts (i.e., leling: Continue data analysis support for TMD systems in Dem/Val and EMD. Continue demonstration of TMD	nent flights and intercepts (i.e., ID. Continue demonstration of TMD
	radar/optical discrimination algorithms to finalize EMD algorithms. Demonstrate real-time algorithms for battlefield learning using neural networks, field data, and simulations on LDS. Continue development of real-time sensor algorithms for resource allocation and multi-sensor fusion. Incorporate new field data sets from the transportable radar into the TMD bulk classifiers to adjust parameters for objective system. Maintain and refine signature modeling to run with higher resolution at enhanced computational speed. Deliver validated signature models for high priority engagement scenarios. Continue participation in international technical exchange programs in the areas of optical and radar discrimination, TBM reentry, MESAR tactical trials and signature phenomenology.	o algorithms. Demonstrate real-time algorithms for the development of real-time sensor algorithms for resortable radar into the TMD bulk classifiers to adjust pher resolution at enhanced computational speed. Delation in international technical exchange programs in d signature phenomenology.	attlefield learning using neural ource allocation and multi-sensor arameters for objective system. iver validated signature models for the areas of optical and radar
- \$38,622 Acquisition Strateg (Phillips Laborator) (Institute for Defen	 \$38,622 Total Acquisition Strategy: This project funds data centers, data collection platforms, and algorithm and model development through executing agents in the Air Force (Phillips Laboratory and Arnold Engineering Development Center), Army (Space and Strategic Defense Command), Navy (Naval Research Laboratory) and OSD (Phillips Laboratory and Arnold Engineering Development Center), Army (Space and Strategic Defense Command), Navy (Naval Research Laboratory) and OSD (Institute for Defense Analysis) via existing contracts. With the executing agents, free and open competitive contracts will be used to the maximum extent possible. 	ms, and algorithm and model development through e pace and Strategic Defense Command), Navy (Nava gents, free and open competitive contracts will be use	xecuting agents in the Air Force I Research Laboratory) and OSD d to the maximum extent possible.
Project 1155	Pag	Page 7 of 120 Pages Ex	Exhibit R-2 (PE 0603872C)

RDT&E BUDGET ITEM J	FEM JUS	TIFICAL	TION SE	IEET (R	USTIFICATION SHEET (R-2 Exhibit))ji		DATE Fe	February 1997	766
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NU 060	PE NUMBER AND TITLE 0603872C Joint	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	iter Miss	le Defen			PROJECT 1155
B. Program Change Summary (\$ in Thousands)	ζ									
Previous President's Budget Current Budget Submit/President's Budget		EY 1996 36,984 36,908	ĬΤ	FY 1997 41,524 31,338	EY 1998 38,988 37,835	FY 1999 39,940 38,622		Total <u>Cost</u> 157,436 144,703		
Change Summary Explanation: Funding: Decrease in FY97 funds was due to reduction of the AST program to offset part of the higher priority Department unfunded requirement. Schedule: None Technical: None	to reduction c	f the AST p	rogram to of	ifset part of t	he higher pri	iority Depar	tment unfun	ded require	ment.	
C. Other Program Funding Summary (§ in Thousands)	(spuesno									
2400 NMD Program, PE 0603871C 1155 Phenomenology Program, PE 0603173C	EY 1996 730,718 2,410	EX 1997 828,864 18,309	EY 1998 504,091 26,740	EY 1999 393,085 26,205	EY 2000 309,748 20,401	EY 2001 309,584 21,204	FY 2002 391,858 22,399	EY 2003 392,433 22,926	To Compl Cont Cont	Total Cost Cont
D. Schedule Profile										
-	EY 1996 2 3	4	1 E	FY 1997 2 3	4	FY 1998	∞l ω 4		FY 1999	4
Navy Area TBMD (formerly Lower Tier) X Deliver software releases (optical/radar discrimination) CORPS SAM, Sea-based Theater-wide X (Upper Tier) - Deliver software releases(algorithms, plumes, backgrounds,		-				ı				-
optical/radar discrimination algorithms) Deliver new software releases (OSC) X Support BMDO test flight programs	×	×	×		×	××	×× ×	×	×	××
Project 1155			Page 8 of 120 Pages	20 Pages			Exhibil	Exhibit R-2 (PE 0603872C)	603872C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-	2 Exhib	it)	DATE	TE February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Join	rle int Theaf	D TITLE Joint Theater Missile Defense	Defense		РRОЈЕСТ 1155
EY 193	EY 1997 2 3	1 4	FY 1998 2 3	4	FY 1999 1 2 3	4
TWD-GBR - Deliver software releases (radar discrimination algorithms) THAAD - Deliver software releases (backgrounds, optical discrimination	×					
algorithms) TMD GBR - Deliver software releases (radar discrimination algorithms) Deliver new software releases (SSGM) THAAD - Deliver software releases	×	×	* *	×		×
(background, optical discrimination algorithms) Upgrade MDDC and AMSC data retrieval and data analysis tools					× ×	-
Initiate BMDO sponsorsing or Coora Gemini system Cobra Gemini - provide mission planning and data analysis costs						
Project 1155	Page 9 of 120 Pages			Exhibit F	Exhibit R-2 (PE 0603872C)	

RD.	RDT&E PROGRAM ELEME	RAM EL	EMENT/F	NT/PROJECT COST BREAKDOWN (R-3)	COSTE	REAKD(JWN (R-	3)	DATE Fe	February 1997	26
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation			PE NUMBER AN 0603872C		ЭТІТІЕ Joint Theater Missile Defense	issile Defe			PROJECT 1155
A. Project Cost Breakdown (\$ in Thousands)	eakdown (\$ in	[housands]									
				FY 1996		FY 1997	FY 1998	FY 1999			
Prime Contracts OGA Support Confracts Program Management Trital	. ·			28,329 2,109 4,505 1,965 36,908		21,352 2,109 5,887 1,990 31,338	27,069 2,109 6,763 1,894 37,835	28,631 2,109 5,990 1,892 38,622			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ijon History and	d Planning In	formation (S is	1 Thousands)							
Performing Organizations:	izations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget EY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	nt Organizations										
Support and Management Organizations Sverdrop Teledyne Brown Colsa Boeing MIT/Lincoln Lab Xontech Nichols Research Photon Research Soarta Project 1155	ement Organizat	Successions		Pag	Page 10 of 120 Pages UNCLASSIFIED	800 11,231 923 13,452 2,581 1,291 711 2,211 701	890 7,645 1,503 6,826 2,791 1,596 1,596 2,810 1,294	910 7,598 1,565 13,932 2,343 1,171 1,171 2,671 1,211	0 910 8 9,272 5 1,560 2 14,057 3 2,253 1 1,126 1 1,126 1 2,626 1 1,202 Exhibit R-3 (PE 0603872C)	0603872C)	3,510 35,746 5,551 48,267 9,968 5,184 4,604 10,318 4,408

RD	RDT&E PROGRAM ELEME	SRAM EL	EMENT/F	NT/PROJECT COST BREAKDOWN (R-3)	COST B	REAKDO	WN (R-3	<u> </u>	DATE Fe	February 1997	76
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation			PE NUMBER AND TITLE 0603872C Joint	AND TITLE	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ssile Defe			PROJECT 1155
Contractor or Government Performing Activity Miscellaneous	Contract Method/Type or Funding <u>Vehicle</u>	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996 3,007	Budget FY 1997 4,387	Budget FY 1998 5,263	Budget FY 1999 4,490	Budget to Complete	Total Program 17,147
Test and Evaluation Organizations	. Organizations										
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	tion History and	l Planning Inf	ormation Cor	itinued (S in Tk	ousands)						
Government Furnished Property:	ished Property:										
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Delivery <u>Date</u>	,	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property	nt Property										
Support and Management Property	ement Property										
Test and Evaluation Property	Property										
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	velopment d Management valuation					36,908	31,338	37,835	38,622		144,703
Total Project						36,908	31,338	37,835	38,622		144,703
Project 1155				Page	Page 11 of 120 Pages	ges		Exhi	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&E BUDGET ITEM	•	TIFICA.	TION S	JEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	TITLE Ioint The	E NUMBER AND TITLE 3603872C Joint Theater Missile Defense	ile Defen	esi	<u> </u>	РРОЈЕСТ 1161
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1161 Advanced Sensor Technology	1,270	3,334	3,364	3,208	3,199	3,151	3,148		3,153 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

mission in all required environments. Ballistic missile defenses must be able to operate in nuclear environments and against countermeasure threats. The requirements for the Survivability program are: define, develop and demonstrate Survivability Enhancement Options (SEO) for TMD systems; develop and transfer SEO technology The goal of this program is to develop and demonstrate survivability technologies to insure that Theater Ballistic Missile Defense (TMD) systems can perform their base to research and development centers and laboratories; provide risk reductions to support THAAD Radar Milestone II. This program develops and demonstrates survivability technologies to ensure that TMD elements can perform their mission in all expected hostile threats. Approaches deception (CCD), SEO development; Electromagnetic Environmental Effects (E3) engineering support, survivability/operability demonstrations, development of issue missile defense systems at Engineering Manufacturing Development (EMD), will provide near-term improvements to existing systems, and will provide necessary risk system requires application of extensive CCD technologies which have been developed by the Army Labs. Technologies will be available for incorporation into core resolution approaches; development of Anti-Radiation Missile (ARM) Countermeasure Evaluator (ACE); and hardened technology integration. ACE combines the desirable effects of low-cost digital simulations and hardware testing of actual ARM hardware in open- and closed-loop simulations. ACE will be used to develop initial ARM Electronic Counter-Countermeasure (ECCM) techniques for THAAD/GBR and PAC-3. The multi-spectral signature of the deployed THAAD Radar include: studies/analyses; defense suppression threat mitigation technologies development; developing enhanced shelters applying camouflage, concealment and reduction evidence to support THAAD Radar, and Medium Extended Air Defense System (MEADS) system milestone decisions.

This program has developed tools to evaluate THAAD Radar performance under defense suppression threats and in hostile environments. These evaluations support continued to be developed. CCD techniques applied to the THAAD Radar were evaluated for effectiveness in battlefield conditions. Requirements for the THAAD the THAAD Radar Milestone II decisions. The ACE operational capability was demonstrated. Countermeasures for precision guided missiles and cruise missiles Radar to be protected against electromagnetic environmental effects were reviewed and design guidelines were identified.

FY 1996 (\$ in Thousands):

Exhibit R-2 (PE 0603872C)	Page 12 of 120 Pages	Project 1161
	Total	- \$1,270
	reviewed and design guidelines were identified.	
ted against electromagnetic environmental effects were	effectiveness in battlefield conditions. Requirements for the THAAD Radar to be protected against electromagnetic environmental effects were	
s applied to the THAAD Radar were evaluated for	precision guided missiles and cruise missiles continued to be developed. CCD techniques applied to the THAAD Radar were evaluated for	
ability was demonstrated. Countermeasures for	evaluations support the THAAD Radar Milestone II decisions. The ACE operational capability was demonstrated. Countermeasures for	
suppression threats and in hostile environments. These	This program has developed tools to evaluate THAAD Radar performance under defense suppression threats and in hostile environments. These	- \$1,270



RDT&E B	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ICATION	SHEET (R-2 Exhibi	t)	DATE February 1997	ry 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	alidation	Œ.	PE NUMBER AND TITLE 0603872C Join	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	er Missile D	efense	РРОЈЕСТ 1161
FY 1997 (\$ in Thousands): - \$3,334 Conduct. Waveform Conduct survivabi - \$3,334 Total	unds): Conduct ACE evaluation of PATRIOT and MEADS TMD radars against countermeasures. Repaired ACE to allow testing of THAAD radar waveforms. Implement E(3) program and develop NBC guidelines to optimize protection to TMD systems while minimizing cost and weight. Conduct analysis of vulnerability to Precision Guided Munitions (PGM), and analysis of PGM SEO designs. Continued development of TMD survivability technologies in CCD. Total	MEADS TMI develop NBC on Guided Mu	D radars agains guidelines to o initions (PGM),	t countermeasure ptimize protectio , and analysis of 1	s. Repaired AC n to TMD syster PGM SEO desig	RIOT and MEADS TMD radars against countermeasures. Repaired ACE to allow testing of THAAD radar ogram and develop NBC guidelines to optimize protection to TMD systems while minimizing cost and weigh y to Precision Guided Munitions (PGM), and analysis of PGM SEO designs. Continued development of TM D.	AAD radar st and weight. nent of TMD
in Thousa	unds): Develop CCD/technologies for THAAD Radar and THAAD Systems signature management. Utilize ACE for integrated ARM/ECCM evaluation for THAAD Radar. Support THAAD Radar EMD testing. Evaluate THAAD Radar software for survivability. Conduct SE of principle test. Continue environmental model development and enhancements. Total	dar and THA/ AAD Radar E nodel developi	AD Systems sig SMD testing. E ment and enhar	nature managem valuate THAAD icements.	ent. Utilize AC Radar software	FHAAD Radar and THAAD Systems signature management. Utilize ACE for integrated ARM/ECCM Support THAAD Radar EMD testing. Evaluate THAAD Radar software for survivability. Conduct SEO proof conmental model development and enhancements.	CCM
FY 1999 (\$ in Thousands): - \$3,208 Demonst spectral of - \$3,208 Total	unds): Demonstrate and validate Pre-Planned Product Improveme spectral decoys for TMD systems. Continue E3 programs Total	uct Improvem e E3 programs	ent SEOs for T s	HAAD radar. U	tilize ACE for T	lanned Product Improvement SEOs for THAAD radar. Utilize ACE for THAAD/GBR radar evaluation. Multiss.	aation. Multi-
Acquisition Strategy: The surve Survivability technologies chosused to the maximum extent poetaluated according to innovation	Acquisition Strategy: The survivability technology program supports the tailored and streamlined acquisition strategy employed by the TMD acquisition managers. Survivability technologies chosen for evaluation/development will be based on requirements. Within the executing agents, free and open competitive contracts will be used to the maximum extent possible to accomplish specific work packages in accordance with field laboratory acquisition procedures. Contract proposals will be evaluated according to innovative technology approaches, responsiveness to program requirements, quality of proposed deliverables, and cost.	orts the tailore I be based on packages in a siveness to pro	ed and streamli requirements. accordance witl ogram requiren	ned acquisition st Within the execu 1 field laboratory tents, quality of F	trategy employe tring agents, free acquisition prov proposed deliver	d by the TMD acquisitio and open competitive coedures. Contract propor ables, and cost.	n managers. ontracts will be sals will be
B. Program Change Summary (\$ in Thousands) Previous President's Budget Current Budget Submit/President's Budget		EY 1996 921 1,270	EY 1997 3,531 3,334	EX 1998 3,498 3,364	FY 1999 3,353 3,208	Total <u>Cost</u> 11,303 11,176	
Project 1161		Page 1.	Page 13 of 120 Pages			Exhibit R-2 (PE 0603872C)	72C)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	EM JUSTIFICA	TION SH	EET (R	2 Exhit	Ĕ		DATE EAR	Eobr., 2007	
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUI	PE NUMBER AND TITLE 0603872C Joint	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ter Missi	ile Defen		PR PR	PROJECT
Change Summary Explanation: Funding: OSD reduction									
Schedule: None									
Technical: None									
C. Other Program Funding Summary (\$ in Thousands)	(sands)								
2260 THAAD System, PE 0603861C	EY 1996 FY 1997 565,818 341,307	FY 1998 294,647	FY 1999 16,778	FY 2000 0	EY 2001 0	FY 2002 0	EY 2003 0	To Compl TBD	Total Cost TBD
D. Schedule Profile									
ACE eval of GBR CCD shelter POP E3-THAAD Radar susceptibility guide THAAD Milestone II CCD SEO test/trades ACE eval of MEADS CCD SEO POP E3 guidelines update PAC-3 Milestone III ACE test of BM/C3 SEO suite SEO design to counter PGM ARM/ECCM for THAAD Radar ACE/ECCM for THAAD Radar Upgrade CCD technologies SEO integration experiment	EY 1996 2 3 4 X X X X	2 X X - 2 EX	EY 1997 2 3 X X X X	4 ××× - × × ××	EY 1998 2 3	% × × × × × × × × × × × × × × × × × × ×	1 2 E	EY 1999 2 3	4 ×
Project 1161		Page 14 of 120 Pages	0 Pages			Exhibit	Exhibit R-2 (PE 0603872C)	03872C)	

RD	RDT&E PROGRAM ELEME	SRAM EL		NT/PROJECT COST BREAKDOWN (R-3)	COST B	REAKDO	WN (R-	3)	DATE F	y 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Va	lidation			PE NUMBER 060387	PE NUMBER AND TITLE 0603872C Joint	Theater M	DE NUMBER AND TITLE OG03872C Joint Theater Missile Defense	ense	<u>-</u>	РRОЈЕСТ 1161
A. Project Cost Breakdown (\$ in Thousands)	reakdown (S in '	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999	_,		
Demonstration & Validation Total	/alidation			1270 1,270		3334 3,334	3364 3,364	3208 3,208			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ition History and	d Planning In	formation (\$ i	n Thousands)							
Performing Organizations:	nizations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1992	Budget to Complete	Total Program
Product Development Organizations BDM CPFF BDM CPFF NRC CPFF BAH CPFF TBE CPAF MICOM MIPR	ent Organizations CPFF CPFF CPFF CPFF CPFF CPAF	21 Dec 90 14 Feb 92 10 Jul 92 6 Mar 92 Multiple		•		431 0 216 175 50 0	1000 1127 0 0 0 0 1000	1000 1159 0 0 0 0	1000 1003 0 0 0 0 1000	Cont Cont 0 0 0 Cont	3,431 3,289 216 175 50 3,000
Support and Management Organizations SSDC PMA Mu Misc Mu	gement Organizal PMA	lions Multiple Multiple				392 6	200	200	200	Cont	992
Test and Evaluation Organizations	n Organizations										
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	ition History an	d Planning In	formation Co	ntinued (S in Th	ousands)						
Project 1161				Page	Page 15 of 120 Pages	ages		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&E PROG	RAM ELEM	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BR	EAKDO	WN (R-3		DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	idation		PE NUMBER AND TITLE 0603872C Join(AND TITLE C Joint T	DITLE Joint Theater Missile Defense	ssile Defe		T 7	РRОЈЕСТ 1161
Government Furnished Property:									
Contract Method/Type Item or Funding Description Vehicle	Award or Obligation Do Date Da	Delivery Date	Total Prior to EX 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property								Cont.	
Support and Management Property								Cont.	
Test and Evaluation Property									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation				872 398	3,127	3,159 205	3,003		10,161
Total Project				1,270	3,334	3,364	3,208		11,176
		•							
Project 1161		Pag	Page 16 of 120 Pages	sa		Exhi	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&E BUDGET ITEM	EM JUS	TIFICA:	TION S	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	oit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ritle oint Thea	ater Miss	ile Defen	se	<u>Р</u>	РВОЈЕСТ 1170
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1170 TMD Risk Reduction	41,521	23,184	35,267	25,045	24,920	24,803	24,773	24,817	24,817 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

This project is the primary BMDO risk mitigation program addressing TMD target/threat signature and the sensor-to-system interface issues for all TMD systems. How fabrication techniques. In all cases, the target signature data and the analyses address specific questions relating to how a radar first identifies a missile (discrimination), support resolution of unexpected critical problems that emerge during their engineering and testing phases; Kill Assessment Program which investigates the signatures and results of a target intercept; and the Sapphire Statistical Characterization and Risk Reduction (SSCARR) program which determines window/dome reliability and potential targets appear to radar and infrared seekers is an important issue which allows TMD acquisition programs to limit costs by concentrating designs on narrow analyzes targets with signature characteristics similar to those anticipated on foreign threats; the Target Signature Measurements Program which observes and directs bands of key threat signature characteristics. This project consists of five elements: TMD Critical Measurements Program (TCMP) which builds, flies, observes, and how the radar passes the missile location to a seeker (sensor to seeker handover), how the seeker determines the best place to hit the target (aim point selection), and how the defender can tell if a missile is destroyed (kill assessment). The core sensor costs used in this project to collect target signature data will be provided under opportunities; the TMD Seeker Test/Measurements Program which uses an experimental seeker test bed to evaluate emerging missile seeker technologies and to the analysis of signatures from BMDO test targets (STORM, HERA, etc.) to obtain target signature insights, and which exploits other similar threat signature projects 1155 and 3360. This project funds the specific sensor tasks for each mission.

sensors give both target data and representative signature data as seen by TMD system sensors. The TCMP program performs the analysis on the data obtained in these hardware, flight instrumentation and data analysis of the TCMP flights are all included in the TCMP budget. TCMP 2 will consist of three medium range flights, in the TMD Critical Measurements Program. This program supports the risk mitigation efforts in TMD signatures. TCMP is a flight test program where threat representative argets are flown at the Kwajalein Missile Range (KMR) or other facilities to observe typical threat-like objects in flight with a sophisticated suite of sensors. These flights. In all cases, the target and threat data and the analysis address the specific areas of discrimination, target object map handover and aim point selection. The fourth quarter of Fiscal Year96 and two in the second quarter Fiscal Year97.

this decision process. Since opportunities to observe actual TMD missile intercepts are rare, this program will emphasize ground test measurements and construction of shoot doctrine, the program is conducting a series of specialized sensor data collections of TMD interceptor tests, follow-on data analysis, and algorithm development. The most challenging aspect is gathering enough pertinent data from various types of intercept scenes to identify and evaluate those observable characteristics serving appropriate action. This kill assessment capability will also help measure defense system effectiveness and identify threat warhead type. In support of this shoot-look-Kill Assessment. This program is developing the technical basis for the TMD architecture battle management decision kill assessment capability. This capability will enable the battle manager to respond nearly "real-time" following a target intercept engagement to ceasefire, to order a second shot, or to cue the lower tier for analytical models and tools for developing and validating algorithms for the TMD acquisition program.

roject 1170

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RDT&E BUDGET ITEM JUSTIFICATION	I JUSTIFICATION SHEET (R-2 Exhibit)	February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROFECT
4 - Demonstration and Validation	0603872C Joint Theater Missile Defense	1170
TMD Seeker Test/Measurements: This program provides for the application, integration, and testing of the latest available seeker technologies into on-going TMD	des for the application, integration, and testing of the latest available seeker technolo	gies into on-going TMD

system context, allowing for risk assessment prior to acquisition commitment. In supporting the solution of technical problems arising in seeker acquisition programs, performance in the high temperature, low altitude flight regime. The SES provides BMDO with independent evaluation of emerging seeker technologies in a realistic seeker designs. The program is divided into two parts; the first supports the Seeker Experimental System (SES) which is used to evaluate missile seeker performance functions and the second is a seeker window sapphire material characterization effort designed to provide a critical database for designers to evaluate seeker window the SES can address a wide range of design and implementation issues such as hardware/software integration and evaluation of seeker functional algorithms. The sapphire material test activities serve as risk mitigation for Theater High Altitude Area Defense (THAAD), Navy Standard Block IVA Missile and the ARROW Programs for improved survivability confidence of the seeker window,

Working Group (TSWG) and the funding for each mission to the sensor platforms for each flight. The data collected is utilized by the acquisition programs, the TSWG, Sealite Beam Director, etc.) on BMDO interceptor target flights (LANCE, STORM, HERA, etc.). This program also provides the tasking through the Target Signatures Target Signature Measurements. This program funds the per mission costs to acquire data using sophisticated sensor platforms (Airborne Surveillance Testbed, HALO, and the Targets Program to establish target in-flight signature characteristics for use in hardware development and interceptor algorithm assessment.

interceptors' available battle-space. In addition, diagnostic techniques are being used in an attempt to demonstrate correlation's between sapphire surface and volume validation effort with emphasis on problems relating to predicting jet interaction effects, an assessment of advanced seeker window technology to remove blur where SSCARR is a joint effort involving the THAAD, Navy SM Block IVA, and ARROW programs. Due to its mechanical strength, high thermal conductivity, and high transparency in the mid-wave infrared, sapphire has become the material of choice for TMD seeker windows and domes. SSCARR employs statistical procedures to determine window/dome reliability for the participating programs. This probability of failure data will allow designers and battle planners to more fully exploit the features and "weak" sapphire, thus providing a sapphire screening technique. Potential follow-on activities to SSCARR include a computational fluid dynamics extreme accuracy in angle-rate measures are required, and an investigation of the utility of reactive materials on hit-to-kill interceptors.

FY 1996 (\$ in Thousands):

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Project 1170

R	RDT&E BUDGET ITEM JUSTIFICAT	USTIFICATION SHEET (R-2 Exhibit)	(R-2 Exhib	it)	DATE February 1997	997
BUDGET ACTIVITY 4 - Demonstration	вирвет Астіvітץ 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint	D TITLE Joint Theat	PE NUMBER AND TITLE OG03872C Joint Theater Missile Defense		PROJECT 1170
EY 1997 (\$ in Thousands): - \$15,144 Cond and r	Conduct TCMP 2A and 2C experimental flight test; analyze, and report test results. Continue TCMP 3 experimental flight test planning for long and mid-range flights to support THAAD EMD and Navy Upper Tier, and to evaluate potential countermeasures and tactics. Purchase and interest and tactics.	analyze, and report Navy Upper Tier, a	test results. Cond	inue TCMP 3 exp	erimental flight test plannir asures and tactics. Purchas	ig for long and
- \$3,353	Continue to collect and analyze sensor data of intercept tests and transfer kill assessment technology to TMD Major Defense Acquisition Programs (MDA DS): expline and unarrate as requisition programs (MDA DS): expline and unarrate as required 1:11 constants of the continue of the continue of the continue and unarrate as required 1:11 continued to the continue of t	Sept tests and transfer	r kill assessment	technology to TM	D Major Defense Acquisiti	uo
	Continue electro-optical infrared support testing of test program. Continue SSCARR joint effort.	missile seekers with	Seeker Experime	ntal System (SES)	d upgrade, as required, kin assessment argoinnin performance. support testing of missile seekers with Seeker Experimental System (SES) and complete the sapphire material joint effort.	material
- 52,177 - \$23,184	Continue target measurements and observe and characterize interceptor targets and flight tests. Total	acterize interceptor	targets and tlight	tests.		
FY 1998 (\$ in Thousands): - \$26,131 Purch	nase boosters and remaining	for TCMP 3 flights,	focusing on cour	termeasures and l	payload hardware for TCMP 3 flights, focusing on countermeasures and longer range threats. Conduct final	ıct final
- \$6,904	Continue to collect intercept data and to develop the	primary kill assessr	nent algorithms f	or Engineering Ma	and to develop the primary kill assessment algorithms for Engineering Manufacturing and Development	ient
- \$2,232 - \$35,267	(EMD) in support of the traval radat system and havy theater wide. Continue target measurements and observe and characterize interceptor targets. Total	radar system and havy incater wide, d observe and characterize interceptor t	rargets.			
FY 1999 (\$ in Thousands):	usands):	2		•		
- \$21,425	Conduct 1 CMT 3 ingin tests, data confection and analysis. Fran and prepare for 1 CMP 4 experiments. Continue to collect intercept data and test the primary kill assessment algorithms for EMD in support of Test.	a conection and analysis. Fian and prepare for LUMP 4 experiments. and test the primary kill assessment algorithms for EMD in support of Navy Upper Tier.	pare for I CMF 4 gorithms for EMI	experiments.) in support of Na	vy Upper Tier.	
B. Program Change S	B. Program Change Summary (S in Thousands)					
Previous President's Budget	EY 1996	FY 1997	EY 1998	FY 1999	Total Cost	
Current Budget Submit/President's Budget		23,184	35,267	25,045	125,017	
Change Summary Explanation: Funding: The FY97 an	Explanation: The FY97 and FY98 funding was reduced by \$13.5M to fund higher priority projects.	d higher priority pro	jects.			
Project 1170	Pe	Page 19 of 120 Pages		Ex	Exhibit R-2 (PE 0603872C)	



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	TEM JUSTIFICAT	TION SHE	ET (R-	2 Exhib	Ē		DATE Feb	February 1997	7
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER ANI 0603872C	PE NUMBER AND TITLE 0603872C Joint	D TITLE Joint Theater Missile Defense	ter Miss	le Defen		PR 11	PROJECT 1170
Schedule: None									
Technical: None									
C. Other Program Funding Summary (\$ in Thousands)	usands)								
1266, Navy Theater Wide TBMD 0603868C	EX 1996 FY 1997 200,442 304,171	FY 1998 F	FY 1999 192,073	EY 2000 191,229	EY 2001 190,930	EY 2002 145,190	FY 2003 149,444	To Compl	Total Cost
D. Schedule Profile									
TCMP Campaign 2B TCMP Campaign 2A, 2C TCMP Campaign 3 Planning Conduct TCMP Campaign 3 Provide Kill Assessment Algorithms	EY 1996 2 3 4 4 X	T S X X X X X X X X X X X X X X X X X X	EY 1997 X X	-	FY 1998	∞l ε. 4 ×	- ×	EY 1999 2 3	4
Project 1170		Page 20 of 120 Pages) Pages			Exhibi	Exhibit R-2 (PE 0603872C)	603872C)	

RD	RDT&E PROGRAM ELEME	SRAM EL		ROJECT	NT/PROJECT COST BREAKDOWN (R-3)	REAKD	JWN (R-	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Va	lidation			PE NUMBER 060387.	PE NUMBER AND TITLE 0603872C Joint	Theater M	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense		P -	РВОЈЕСТ 1170
A. Project Cost Breakdown (\$ in Thousands)	ireakdown (S in '	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999			
Engineering Studies Support Total				36,938 3,013 1,570 41,521		21,920 1,264 0 23,184	31,170 4,097 0 35,267	22,692 2,353 0 25,045			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ition History an	d Planning In	formation (\$ i	1 Thousands)							
Performing Organizations:	nizations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FX 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations Multiple Multiple	ient Organizations Multiple	s Multiple				39,938	23,184	35,267	25,045	Cont	123,434
Support and Management Organizations SSDC Alloc	gement Organizal Alloc	tions				1,583	0	0	0	Cont	1,583
Test and Evaluation Organizations	n Organizations										
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	sition History an	d Planning In	formation Co	ıtinued (\$ in 1	(housands)						
Government Furnished Property:	nished Property:										
Project 1170				Pa	Page 21 of 120 Pages	ages		Exh	ibit R-3 (PE	Exhibit R-3 (PE 0603872C)	
2						€ 3.					

RDT&E	PROG	RAM ELE	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BI	REAKDO	WN (R-3	€ 	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	and Vali	dation		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ssile Defe		<u>-</u>	PROJECT 1170
Contract Method/ Item or Fundi Description Vehicle	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property	perty									
Support and Management Property	Property									
Test and Evaluation Property	ž i		٠.							
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	ment agement on				39,938 1,583	23,184	35,267	25,045		123,434
Total Project					41,521	23,184	35,267	25,045		125,017
			•							
Project 1170		j	Pag	Page 22 of 120 Pages	ges		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	



RDT&E BUDGET ITEM	_	TIFICA	TION S	JEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	E NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ater Miss	ile Defen	Se	-	РRОЈЕСТ 1270
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1270 Applied Inert Mats and System Tech Program	9,137	0	0	0	0	0	0	0	твр	тво

A. Mission Description and Budget Item Justification

contingencies not currently addressed by the TMD system programs. The program uses existing contracts and technologies currently under development to reduce schedule and cost, and will be planned and conducted with BMDO, Air Force, Navy, and Army elements to make maximum use of existing Service infrastructures. The to-kill intercepts of TBMs within the atmosphere. The demonstrations will validate the solution to critical KKV technologies and will provide: (1) new capabilities with Atmospheric Interceptor Technology (AIT) Program: The AIT program will develop, integrate and demonstrate the critical technologies for performing hypersonic hitreduced costs/risks compared to current interceptor weapons systems, and enhancements to other interceptors under development; (2) reduction of technical risks and costs in support of acquisition programs through direct technology insertions; and (3) technical solutions to provide theater defense interceptor capabilities for AIT project will participate in the UAV/BPI Studies (PMA 2259) and the Navy Theater Wide requirements studies.

TBMs in the atmosphere. A number of cooled window concepts have been developed and demonstrated, prototype strap-down seeker hardware has been developed and The AIT program has successfully developed and demonstrated critical technologies for hypersonic endoatmospheric kill vehicles that perform hit-to-kill intercepts of tested, and kill vehicle design concepts have been completed. The program will complete prototype seeker hardware and testing, develop a solid propellant divert and attitude control system (DACS), and integrate complete ground and potential flight test hardware. Aero-optical shock tunnel tests were completed on an externally cooled window concept. A downselect to a single prime contractor was conducted in first quarter Fiscal Year 1996.

FY 1996 (\$ in Thousands):

- \$9.137	Atmospheric Advanced Interceptor Technology: Continue prototype strapdown seeker validations and tests. Complete downselect to single
	ç
	joint validation, and initiate development of solid propellant divert and attitude control system (DACS) components. Continue detailed design of
	KKV vehicle.

- 9 69
- \$9,137 Total
- FY 1997 (\$ in Thousands):
 - 0**%** €

Project 1270

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RDT&E BUDGET ITEM JU	JUSTIFICATION SHEET (R-2 Exhibit)	SHEET (R-2 Exhib	<u>(</u>	DATE February 1997	1997
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603872C Join	Joint Theal	PE NUMBER AND TITLE O603872C Joint Theater Missile Defense]	РРОЈЕСТ 1270
– \$ – \$0 Total						
FY 1998 (\$ in Thousands): - \$0 - \$ - \$ - \$ - \$ - \$ - \$						
FY 1999 (\$ in Thousands): - \$0 - \$ - \$ - \$ - \$ - \$						
Acquisition Strategy: The AIMST Project uses U.S. Army Space and Strategic Defense Command (USASSDC), DoD and DoE laboratories to fund contractors supported by relevant in-house expertise to meet the AIMST milestones. Weapons systems prime contractors acquire license agreements to use advanced manufacturing/producibility processes (e.g., composite materials, baffles and nozzles) developed by the AIMST Project. International funding (e.g., UK and Japan) and joint agency coalitions (e.g., NASA, DoE and ARPA) are assembled to obtain critical level of effort (e.g., US/UK STRV-2, BMDO/AF/ARPA Smart Structures, US/Japan Composites and superconducting materials programs). The AIT program plan will consist of development and validation of endoatmospheric kill vehicle technologies for potential use in advanced TMD systems, such as advanced NTWD THAAD, MEADS and UAV/BPI; and options for the design, fabrication, and test of the KKVs; options for KKV/booster integration and flight tests. USASSDC will provide technical and contract management of the AIT prime contract. On-going, competitively-awarded, CPFF contracts for the kill vehicle technologies within the AIT program will continue through the completion of ground testing and potential flight tests.	Army Space and Strategic AIMST milestones. Weapote materials, baffles and no PA) are assembled to obta programs). The AIT programs, such as advanced NITA fight tests. USASSDC viricle technologies within the AIT has a strain of the arms of the arm	Defense Comrons systems prozzles) developain critical levertam plan will cWD THAAD, will provide terme AIT progra	nand (USASSD) ime contractors ed by the AIMS of effort (e.g., consist of develo MEADS and UA chrical and cont m will continue	C), DoD and DoE acquire license agg T Project. Interna US/UK STRV-2, I pment and validat IV/BPI; and optio ract management of through the comp	laboratories to fund contracreements to use advanced tional funding (e.g., UK an BMDO/AF/ARPA Smart St ion of endoatmospheric kill ms for the design, fabricatio of the AIT prime contract. Iletion of ground testing and	tors d Japan) fructures, vehicle on, and test On-going,
B. Program Change Summary (S in Thousands)	•					
Previous President's Budget Current Budget Submit/President's Budget	<u>FY 1996</u> 9,708 9,137	FY 1997 0 0	FY 1998 0 0	FY 1999 0 0	Total Cost 9,708 9,137	
Project 1270	Page 24	Page 24 of 120 Pages		Û	Exhibit R-2 (PE 0603872C)	

RDT&E BUDGET ITEM J	JUSTIFICATION SHEET (R-2 Exhibit)	HS NOI	EET (R-	2 Exhib	ji ji		DATE Feb	February 1997	7(
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUN 0603	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	тге int Thea	ter Missi	le Defen	Se	PR 12	РRОЈЕСТ 1270
Change Summary Explanation: Funding: Changes in funding resulted in realigning of interceptor & sensor technologies within Projects 1270 and 1161 to better reflect the technologies principle Funding: Changes in funding. Execution of the STRV-2 Progra application. The AIT Program was transferred to Project 1270 in FY96 from Project 1265 (BPI), PE 0603870, without funding. Execution of the STRV-2 Progra was transferred to Project 1270 starting in FY97.	g of interceptor & sensor technologies within Projects 1270 and 1161 to better reflect the technologies principle Project 1270 in FY96 from Project 1265 (BPI), PE 0603870, without funding. Execution of the STRV-2 Program	ensor techno 96 from Proj	logies withir	n Projects 12 v1), PE 0603	70 and 116 870, withou	1 to better re t funding. I	effect the tech	mologies pri the STRV-2	nciple Program
Schedule: Delay in program milestones due to cancellation of BPI program and transfer of AIT Technology development to Project 1270 and other funding reductions.	cellation of BPI pa	rogram and tr	ansfer of AI	T Technolog	gy developn	nent to Proje	ct 1270 and o	other funding	50
Technical: None									
C. Other Program Funding Summary (\$ in Thousands)									
EY 1 2400 NMD Program PE 0603871C 730,	FY 1996 FY 1997 730,656 828,864	FY 1998 504,091	FY 1999 393,085	FY 2000 309,748	FY 2001 309,584	FY 2002 391,585	FY 2003 392,433	To Compl Cont	Total Cost Cont
D. Schedule Profile		,							
FY AIT Downselect to single prime contractor.	199 <u>6</u> 3 4	1 2	FY 1997 2 3	4	FY 1998 2 3	∞l ε. 4	1 7	F <u>Y 1999</u> 2 3	4
Project 1270		Page 25 of 120 Pages	10 Pages			Exhibi	Exhibit R-2 (PE 0603872C)	303872C)	

RDT&E	RDT&E BUDGET ITEM J	EM JUS	TIFICA:	TION SE	HEET (R	USTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	Validation			ੁ _ਰ 090	P. ABER AND TITLE 0603872C Join	© ANBER AND TITLE 0603872C Joint Theater Missile Defense	ater Miss	ile Defen		<u>-</u>	РRОЈЕСТ 1270
COST (\$ In Thousands)	ousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
1294 UAVBoost Phase Intercept		5,705	930	0	0	0	0	0	0	TBD	TBD
A. Mission Description and Budget Item Justification The Unmanned Aerial Vehicle (UAV)-Based Boost Phase Intercept (BPI) project covers two tasks; Task 1: Cooperative UAV-Based BPI project with Israel, and Task 2: Development of a US UAV-Based BPI Concept. Task 1 is a cooperative U.S./Government of Israel (GOI) BPI program which involves future development and refinement (risk mitigation) of the Israeli Boost Phases Intercept System (IBIS) concept which is planned to destroy tactical ballistic missiles in the boost phase of flight, before engine cutoff, preferably while in enemy territory. This project is based on the use of UAVs armed with on-board interceptors to provide the means of destroying enemy missiles in their boosting phase of flight. The first task of this two-part project will provide risk mitigation in the development of the GOI's UAV BPI. Task 2 of this effort develops a U.S. UAV-based BPI system concept. It will develop the system requirements, to include: kinetic energy interceptors, UAVs, search and track sensors, Battle Management, Communications, Computers and Intelligence (BMC4I), and the concept of operations (CONOPS) based on readily available U.S. technologies.	udget Item Justific UAV)-Based Boost ed BPI Concept. Ta bost Phases Intercep y territory. This pro he first task of this t ncept. It will develo	ation Phase Interce sk 1 is a cool t System (IB) rject is based wo-part proje p the system	pt (BPI) properative U.S. S) concept on the use of the	yject covers t AGovernmer which is plan f UAVs arm ide risk mitig is, to include	two tasks; That of Israel (med to destreed with on-legation in the street charter charter charter).	ask 1: Coop GOI) BPI pr oy tactical b ooard interce developmer ergy intercer	erative UAV ogram which allistic missi ptors to prort of the GO otors, UAVs, OPS) based	-Based BPI h involves fulles in the bo vide the mea I's UAV BPI, search and on readily av	itercept (BPI) project covers two tasks; Task 1: Cooperative UAV-Based BPI project with Israel, and Task 2: cooperative U.S./Government of Israel (GOI) BPI program which involves future development and refinement (IBIS) concept which is planned to destroy tactical ballistic missiles in the boost phase of flight, before engine ased on the use of UAVs armed with on-board interceptors to provide the means of destroying enemy missiles is project will provide risk mitigation in the development of the GOI's UAV BPI. Task 2 of this effort develops a stem requirements, to include: kinetic energy interceptors, UAVs, search and track sensors, Battle Management gence (BMC4I), and the concept of operations (CONOPS) based on readily available U.S. technologies.	Israel, and Toment and reflight, beforing enemy in this effort definites, Battle Martechnologie.	ask 2: finement e engine nissiles in velops a agement,
EY 1996 (\$ in Thousands): - \$5,705 UAV. availa and d mitigs - \$5,705 Total	unds): UAV-based BPI: Developed U.S. requirements and concept for UAV-based kinetic energy BPI. Generated and evaluated U.S. technologies available for a UAV platform, interceptor, and search and track systems. Developed related BMC4I Technologies. Analyzed available UAVs and develop requirements. Developed preliminary CONOPS for a US UAV concept. Worked with the Israelis to develop a cooperative risk mitigation effort in the areas of interceptors, sensors, and BMC4I.	oped U.S. req form, intercej s. Developed eas of interce	uirements ar otor, and sea preliminary ptors, senso	nd concept fr rch and trach / CONOPS f rs, and BMC	or UAV-bas k systems. I or a US UA	ed kinetic en Jeveloped re V concept.	ergy BPI. C lated BMC4 Worked with	ienerated anα If Technolog 1 the Israelis	d evaluated U ies. Analyze to develop a	J.S. technologed available cooperative	gies UAVs risk
EY 1997 (\$ in Thousands): - \$930 See P - \$930 Total	nds): See PE0603870C: Continue the risk mitigation effort with the GOI and initiate interoperability efforts. Total	nue the risk n	nitigation ef	fort with the	GOI and in	itiate interop	erability eff	orts.			

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Project 1270

FY 1998 (\$ in Thousands):
- \$0 See PE0603870C
- \$0 Total



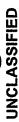
RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET	R-2 Exhil	oit)	/Q	DATE February 1997	, 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Join	D TITLE Joint Thea	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	Defens	ď.	РРОЈЕСТ 1270
FY 1999 (\$ in Thousands): - \$ Project continuation decision expected in FY98. - \$0 Total						
Acquisition Strategy: This project is risk integration for the ABL program. Task 1 of this PMA is a cooperative US/Government of Israel (GOI) risk mitigation effort addressing further MOAB interceptor development, BMC31, along with intraconstellation communications. The effort is being done under a firm fixed price contract. The US and GOI share costs. Task 2 is being accomplished by BMDO tri-service Integrated Product Teams (IPT). Additional support is provided by industry.	i. Task 1 of this PM itraconstellation cor- service Integrated I	A is a cooperati munications. roduct Teams	ive US/Govern The effort is be (IPT). Addition	ment of Isra ing done un nal support	el (GOI) risk miti der a firm fixed p is provided by inc	gation effort rice contract. lustry.
B. Program Change Summary (\$ in Thousands)						
Previous President's Budget 9,706 Current Budget Submit/President's Budget 5,705	EX 1997 9,296 930	FX 1998 9,436 0	FY 1999 0 0	28.	Total Cost 28,438 6,635	
Change Summary Explanation: See PE 0603870C for FY97/98 Funding Funding: Project funding, structure, and objective directed by Congress	, so					
Schedule: None						
Technical: None C. Other Program Funding Summary (\$ in Thousands)						
EY 1996 FY 1997 3359 System Test and Evaluation, PE 0603872C 33,355 42,792	EY 1998 FY 1999 40,307 26,444	9 FY 2000 4 25,763	EY 2001 E 29,793	FY 2002 I	To EY 2003 Compl 30,363	To Total npl Cost
Project 1270	Page 27 of 120 Pages			Exhibit F	Exhibit R-2 (PE 0603872C)	(2)

RDT&E BUDGET ITEM JUSTIFICATION	USTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	1
D. Schedule Profile EY 1996 Complete IBIS Follow-On Report Contract Milestone (Israeli) Risk Mitigation Preliminary US UAV BPI Concept Israeli Risk Mitigation Final Report	EY 1997 2 3 4 1 2 3 X X	FY 1999 1 2 3 X
Project 1270	Page 28 of 120 Pages	Exhibit R-2 (PE 0603872C)

RD	RDT&E PROGRAM ELEME	SRAM EL	EMENT/P	NT/PROJECT COST BREAKDOWN (R-3)	COST B	REAKD(OWN (R-	3)	DATE Fe	February 1997	760
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation			PE NUMBER AND TITLE 0603872C Join	AND TITLE	Theater M	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	esue	T .	РВОЈЕСТ 1294
A. Project Cost Breakdown (S in Thousands)	eakdown (\$ in '	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999	c)		
IBIS Systems Engineering US Systems Engineering Total	eering ering			5,705 5,705		930 930					
B. Budget Acquisition History and Planning Information (\$ in Thousands)	tion History and	d Planning Inf	ormation (S. It	(Thousands)							
Performing Organizations:	izations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total
Product Development Organizations	nt Organizations	, mar									
SMC Navy PEO TADB NAWC DARPA	MIPR MIPR MIPR MIPR	Jan 97 Jan 97	157 250	157 250		1,350 2,025 466 650	157 250 0	0 00	0000	CBT CBT CBT CBT	1,507 2,025 716 650
Support and Management Organizations WJSA CPFF Api SSDC MIPR Sep	ement Organizat CPFF MIPR	ions Apr 96 Sep 96				1,171	523 0	0	0	TBD TBD	1,694
Test and Evaluation Organizations	Organizations										
Project 1294				Page	Page 29 of 120 Pages	iges		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

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RDT&E PRC	GRAM EL	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BR	EAKINO	WN (R-3		DATE Fe	February 1997	160
BUDGET ACTIVITY 4 - Demonstration and Validation	/alidation		PE NUMBER AND TITLE 0603872C Joint	ND TITLE	PE NUMBER AND TITLE OG03872C Joint Theater Missile Defense	ssile Defe	nse	٠.	PROJЕСТ 1294
B. Budget Acquisition History and Planning Information Continued (S in Thousands)	and Planning Inf	ormation Continued (\$ in Th	iousands)						
Government Furnished Property:	ty:								
Contract Method/Type Item or Funding Description Vehicle	pe Award or Obligation Date	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total
velopment rty	Jul			18	0	0	0	TBD	18
Support and Management Property	≱								
Test and Evaluation Property									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	Ħ			4,509 1,196	407				4,916 1,719
Total Project				5,705	930				6,635
		•							
Project 1294		Page	Page 30 of 120 Pages	es.		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	



RDT&E BUDGET ITEM		JUSTIFICATION SHEET (R-2 Exhibit)	TION SI	HEET (R	-2 Exhil	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	e NUMBER AND TITLE OG03872C Joint Theater Missile Defense	ater Miss	ile Defer	esi	P.	РRОЈЕСТ 1294
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2160 TMD Existing System Mods	20,401	22,421	12,328	12,957	0	0	0	0	TBD	ТВО

A. Mission Description and Budget Item Justification

improvements to TMD capabilities. This project consists of three programs: Cueing and Netting, SHIELD, and the Extended Airborne Global Launch Evaluator This project implements non-major defense acquisition program modifications to current and existing warning and surveillance systems that result in fielded

CUEING AND NETTING. The overarching objective of the cueing and netting task is to enable the US Marine Corps AN/TPS-59 long-range surveillance radar to accept external cues from, and pass cues to, different theater sensors in order to facilitate theater ballistic missile (TBM) identification, location, and tracking. The effort will consist of the development, testing, and operational demonstration of hardware and software improvements to the radar and other supporting systems.

intelligence data and SIGINT data on theater ballistic missile (TBM) events to provide more timely warning of worldwide TBM launch point, time, azimuth and impact Attack and Launch Early Reporting to Theater (ALERT) and the Army Joint Tactical Ground Station (JTAGS) programs for incorporation in the operational systems. point prediction to tactical units. As processing improvements and additional sources are integrated and fused, these upgraded capabilities are passed to the Air Force SHIELD (Formerly Talon Shield). The SHIELD program is developing a system that receives and fuses Defense Support Program (DSP) assets, other national The system is co-located at the Joint National Test Facility, Falcon Air Force Base, CO with ALERT.

field a detection, tracking, and cueing system against TBM. EAGLE will be compatible with any Boeing 707 type or larger class aircraft. The prototype is currently planned for installation in the Air Force E-3 Airborne Warning and Control System (AWACS) aircraft. EAGLE represents the integration of several existing technologies into a new sensor suite that will add significant leverage to the overall TBM defense architecture as well as provide significant complementary support to the US and NATO AWACS missions. The principal components of EAGLE are a Wide Area Surveillance Sensor (WASS) from the B-1B program, a High Accuracy Reacquisition Sensor (HARS) from the F-117A Nighthawk program, and a laser range finder from the Navy's Radiant Mist/Outlaw projects. The overall integrator and international participation is at the second tier sub-contractors. Operationally, the EAGLE system will acquire a boosting TBM and track it until shortly after burnout to establish very precise trajectory, launch point, and impact point estimates. This information will be broadcast as a Joint Tactical Information Distribution System (JTIDS) message which will be used to cue active defense radar, support attack operations against the launchers, and provide improved warning for passive defense. The trajectory cue will enable fire control radar from a variety of interceptor systems to efficiently focus their energy into a single beam allowing acquisition much sooner than normally achievable with autonomous operations. This capability maximizes the defended area footprint as required by the Joint Requirements Oversight Council (JROC). EAGLE can greatly improve the defended area against long range theater ballistic missiles versus autonomous operation. In addition, the improved prime contractor is Boeing in Seattle, Washington. The major sub-contractors are Texas Instruments in Dallas, Texas and Rockwell International of California. Extended Airborne Global Launch Evaluator (EAGLE). The EAGLE is a Commercial Off The Shelf (COTS) and Non-Developmental Item (NDI) program that will

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	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	Id Validation PROJECT Of 1294 1294
situational awareness pr missile defenses.	situational awareness provided through BMC31 to the Joint Force Air Component Commander greatly enhances the coordination of the theater air battle and ballistic missile defenses.
FY97 Congressional L language also directed developing an airborne perspectives and total p EAGLE was moved to	FY97 Congressional Language mandated that funding be moved from "TMD Existing Systems - EAGLE" to "Airborne Sensor for Ballistic Missile Tracking". The language also directed the Under Secretary of Defense for Acquisition and Technology {USD (A&T)} provide a plan to congressional defense committees for developing an airborne sensor capability for ballistic missile tracking not later than 19 Jan 97. The language directed that operational user requirements and perspectives and total program cost be given priority consideration in selecting a system to provide this capability. To meet this mandate, the FY97 funds for Task 3 - EAGLE was moved to Task 4 - Airborne Sensor for Ballistic Missile Tracking, the report to Congress written, and program plan developed for the chosen airborne
sensor. The EAULE pr Joint Technology Trans chosen to proceed thron	sensor. The EAULE program will be allowed to proceed at a slower pace due to the funding limitation while the study is conducted and the report written. The Rivet Joint Technology Transfer program will be given initially \$400,000 to participate in the study. Depending on the USD (A&T) decision, an airborne sensor may be chosen to proceed through engineering, manufacturing, and development (EMD) and production.
FY 1996 (\$ in Thousands):	;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
0	furing DSP data with other classified sensor data. EAGLE. Finalize the design, commence sensor ravid prototyping: complete modifications to sensor commonstrate and integrate sensor.
sn = \$097 = E/	subsystems; conduct tests in contractor laboratories to characterize components and subsystems. EAGLE. Update Air Force Theater Air Command and Control Facility (TACCSF) EAGLE simulation and demonstrate modeling.
EA \$20,401 To	EAGLE cost analysis of procurement options and studies from simulations in Europe. Total
FY 1997 (\$ in Thousands): - \$1,393 CUE	ands): CUEING AND NETTING. Develop AN/TPS-59 hardware and software modifications to accept and pass an external cue and conduct
de - \$3,808 SF	developmental testing of cueing and netting capability. SHIELD. Continue SHIELD development test and evaluation activities; continue to incrementally develop, test and demonstrate improved
pr - \$93 EA	processing capabilities and fusion of other intelligence and sensor data sources with DSP. EAGLE. Complete efforts initiated in FY 1996. Characterize sensor performance under conditions more characteristic of the operational
- \$17,127 Airbo - \$22,421 Total	cuvironment against train targets of opportunity and surrogate targets prior to prototype integration on the AWACS TS-3 test aircraft. Airborne Sensor for Ballistic Missile Tracking Total
EY 1998 (\$ in Thousands): - \$1,361 CUE	nds): CUEING AND NETTING. Conduct an operational demonstration of the TPS-59 capability to accept and pass an external cue.
Project 1294	Page 32 of 120 Pages Exhibit R-2 (PE 0603872C)



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RDT&E BUDGEL HEM JUSTIFICATION SHEET (R-2 EXHIDIC)	N SHEE! (K-	Z EXNID	t)		February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	กเ int Theat	er Missile De	fense	РРОЈЕСТ 1294
 \$1,815 SHIELD. Continue SHIELD development, test and evaluation activities; continue to incrementally develop test and demonstrate improved processing capabilities and fusion of other intelligence and sensor data sources with DSP. \$9,152 EAGLE. Continue FY 1997 activities; install and integrate the EAGLE prototype sensor aboard the TS-3 aircraft; conduct EAGLE prototype flight testing. \$12,328 Total 	luation activities; co ind sensor data sourc rate the EAGLE prot	ntinue to inc es with DSP totype sensor	ementally develor aboard the TS-3 a	rest and demonstrate ircraft; conduct EAG	: Improved LE prototype
FY 1999 (\$ in Thousands): - \$12,957 EAGLE. Complete prototype testing and pre-EMD activities initiated in FY98. - \$12,957 Total	vities initiated in FY	.98.			
B. Program Change Summary (\$\in\text{Thousands})					
Previous President's Budget Current Budget Submit/President's Budget 20,401	F <u>Y 1997</u> 24,166 22,421	FY 1998 12,860 12,328	FY 1999 13,593 12,957	Total <u>Cost</u> 70,625 68,107	
Change Summary Explanation: Funding: Funding adjustments made to support higher priority projects.					
Schedule: None					
Technical: None					
C. Other Program Funding Summary (\$ in Thousands)					
FY 1996 FY 1997 FY	FY 1998 FY 1999	FY 2000	EY 2001 EY 2002	FY 2003	To Total Compl Cost
D. Schedule Profile					
$\frac{\text{FY } 1996}{1 2 3 4 1}$	FY 1997 2 3	1	FY 1998 2 3	4 1 2	EX 1999 2 3 4
Project 1294 Page	Page 33 of 120 Pages	ļ	Ü	Exhibit R-2 (PE 0603872C)	872C)

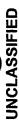
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4 - Demonstration and Validation	Ē				<u> </u>	0603872C		TITLE Joint 7	heate	r Mis	sile D	Juile Joint Theater Missile Defense	ø		PROJECT 1294	=CT
	-		9 <u>99</u> 6	4	-	EV 1997	766	4	-	Ä,	3661	4	-	FY 199	229	
CUEING AND NETTING	•	ì	,	•	•	ł	1	r	•	4	ז	r	-	٧		_
Acquisitions milestones						×										
Engineering milestones							×	;	×	;	;					
EAGLE								<		×	×					
Acquisition Milestone																
Design Review Technical Interchanges	×	×	×	×	×	×	×	×	×	×	×	×				
Engineering Milestone																
Component Ground Lab Test	×	×	×	×	×	×	×	;	;							
Lab and Field Ground Test Drototras Elicht Test							×	×	×	>	;					
Confract Milestone									<	<	<					
Other Program Events																
International Participation Negotiations TALON SHIELD	×	×	×	×												
Acquisition Milestones																
Engineering Milestones																
Upgrade Reviews T&E Milestone	×	×	×	×	×	×	×	×	×	×						
Test and Demos	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
				•												
Project 1294					2age 34	Page 34 of 120 Pages	Pages	:			ш	Xhibit R	2-2 (PE	Exhibit R-2 (PE 0603872C)	Q	
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R	RDT&E PROGRAM ELEMEI	3RAM EL		NT/PROJECT COST BREAKDOWN (R-3)	COSTE	REAKD	OWN (R-	3)	DATE F	February 1997	760
BUDGET ACTIVITY 4 - Demonsti	BUDGET ACTIVITY 4 - Demonstration and Validation	lidation			PE NUMBE 060387	PE NUMBER AND TITLE 0603872C Joint	Theater M	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ense	9 B	РВОЈЕСТ 2160
A. Project Cost	A. Project Cost Breakdown (S in Thousands)	Thousands)		:							
				FY 1996		FY 1997	FY 1998	FY 1999	C I		
Engineering Studies Total				18,156 2,245 20,401	•	21,223 1,198 22,421	11,328 1,000 12,328	12,097 860 12,957			
B. Budget Acqui	B. Budget Acquisition History and Planning Information (\$ in Thousands)	d Planning In	formation (\$)	n Thousands)							
Performing Organizations:	anizations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Developn ESC/XR SMC/XR	Product Development Organizations ESC/XR MIPR SMC/XR MIPR	앸		,		15,487	16,680 5,648	9,547 2,781	12,957 0	0	54,671 13,244
Support and Mana ESC/XR	Support and Management Organizations ESC/XR MIPR	tions				66	93	0	0	0	192
Test and Evaluation Organizations	on Organizations										
B. Budget Acqui	B. Budget Acquisttion History and Planning Information Continued (\$ in Thousands)	d Planning In	ıformation Co	ntinued (S in T	(spuesnou						
Government Fu	Government Furnished Property:	••									
Project 2160				Pag	Page 35 of 120 Pages	pages.		Ext	ibit R-3 (PE	Exhibit R-3 (PE 0603872C)	



RDT	RDT&E PROGRAM ELEMEN	RAM EL	EMENT/PROJECT COST BREAKDOWN (R-3)	COST BE	REAKDO	WN (R-3	(E)	DATE Fe	February 1997	197
BUDGET ACTIVITY 4 - Demonstration and Validation	on and Val	lidation		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	heater Mi	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	İ		РКОЈЕСТ 2160
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery <u>Date</u>	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property	Property									-
Support and Management Property	nent Property									
Test and Evaluation Property	roperty	·								
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	elopment Management Iluation				20,302 99	22,328 93	12,328	12,957		67,915
Total Project					20,401	22,421	12,328	12,957		68,107
			-							
Project 2160			Pag	Page 36 of 120 Pages	sas		Exhi	Exhibit R-3 (PE 0603872C)	0603872C)	

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RDT&E BUDGET ITEM		TIFICAT	ION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Fel	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 0 0 0	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	пте I oint The a	ater Miss	ile Defen	se	2	РRОЈЕСТ 2160
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2259 Israeli Cooperative Project	59,352	43,892	38,715	38,662	38,624	38,591	0	0	ТВD	ТВО

A. Mission Description and Budget Item Justification

Research & Development (R&D), and the Israeli System Architecture and Integration (ISA&I) Project. The U.S. derives considerable benefits from its participation in these projects. The primary benefits are in U.S. gains in technology and technical information that will reduce risks in U.S. TMD development programs. The U.S. This project includes the Arrow Continuation Experiments (ACES) Project, the Arrow Deployability Project (ADP), the Israeli Test Bed (ITB), Israeli Cooperative also benefits from the eventual presence of an anti-ballistic missile defense system in Israel, which provides deterrence of future tactical ballistic missile (TBM) conflicts in that region. This defensive system also contributes to a more robust defensive response should deterrence fail.

Il interceptor upgraded development and test of the Arrow II interceptor. Arrow provides the basis for an informed GOI engineering and manufacturing decision for an I) that developed the preprototype Arrow I interceptor. The ACES project (Phase II) is a continuation of Phase I, and consists of critical lethality tests using the Arrow center and launch control center by the Israelis without U.S. participation. Comprised of three phases, this initiative began with the Arrow Experiments project (Phase GOI development of an anti-tactical ballistic missile (ATBM) interceptor and launcher. The program also includes development of the fire control radar, fire control ATBM defense capability. If successful, the Arrow II will satisfy the Israeli requirement for an interceptor for defense of military assets and population centers and The Israeli / Arrow program consists of efforts to develop a ballistic missile defense system. It includes the U.S.-Government of Israel (GOI) initiative to assist the will support U.S. technology base requirements for new advanced anti-tactical ballistic missile technologies that could be incorporated into the U.S. theater missile defense (TMD) systems.

developed fire control radar, fire control center and launcher control center (LCC). An interface will be developed for AWS interoperability with U.S. TMD systems. The third phase is the ADP which began in Fiscal Year 1996. This phase of the project will pursue the research and development of technologies associated with the Lethality, kill assessment and producibility will continue to be assessed. Subsequent U.S.-Israeli cooperative R&D on other ballistic missile defense concepts may beyond the R&D stage). This effort will include system-level flight tests of the U.S.-Israeli cooperatively developed Arrow II interceptor supported by the Israelideployment of the Arrow Weapon System (AWS) and will permit the GOI to make a decision regarding deployment (without financial participation by the U.S. occur in the future.

Completed experiments identified additional enhancements needed to improve the ITB as an analysis tool. The enhancements incorporated in the ITB to date include Israeli Ministry of Defense (IMOD) in the decision of which defense systems to field, provides insights into command and control in TMD, and trains personnel to The ITB Program is a medium-to-high fidelity theater missile defense simulation that provides the capability to evaluate potential Israeli missile defenses, aids the contingency Middle East theater operations. This funding also provides for a portion of the operation and maintenance of the ITB and for planned enhancements. function in a TMD environment. A structured set of joint U.S./Israeli experiments is being executed to evaluate the role of missile defenses in both mature and

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RDT&E BUDGET ITEM JUSTIFICATION	I JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
4 - Demonstration and Validation	0603872C Joint Theater Missile Defense	se 2160
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radar and weapons models, and a BPI sumulation capability. The BPI enhancement benefited the Israeli BPI study completed in January 1996. The planned Adaptive Battle Management Center (ABMC) enhancement will benefit the U.S. by enabling the ITB to simulate a wide variety of command and control and interoperability

interoperability with U.S. TBMD systems. This task supports efforts in developing an interface to allow for interoperability between Israeli TMD systems and U.S. The Israeli Cooperative R&D program supports the advancement of emerging TMD technologies. This support will advance the technology demonstration phase which will provide for the defense of the State of Israel. It further supports the U.S. technology base needs for these technologies, and furthers the pursuit of TBMD systems and the implementation of such a system.

Israeli Reference Missile Architecture (IRMA), a baseline missile configuration. Evolutionary growth paths to enhance the IRMA robustness against future threats will simulations and models will be used selectively to address significant TMD issues. Collectively, the tasks conducted under this cooperatively sponsored ISA&I project tactical ballistic missile (ATBM) programs, including the Arrow missile development activity, the ADP, and the ITB will be conducted. Finally, previously developed will provide critical insights and technical data to both the U.S. and Israeli governments for improving near-term and evolutionary defenses against ballistic missile The ISA&I tasks provide ongoing analysis and assessment of the baseline, evolutionary, and responsive threats to support the definition and evaluation of an initial be identified. Critical TMD system architecture issues and technologies will be analyzed, and the conformance to established requirements of various Israeli anti-

seeker, radar fuse, first stage booster, sustainer booster, launcher canister, and launcher. The ADP International Agreement was signed in March 1996 and Presidential intercept and target destruction in June 1994. Arrow II design and component testing progressed to the successful demonstration of the new warhead, electro-optical Since program initiation in 1988, Israel successfully improved the performance of its pre-prototype Arrow I interceptor to the point that it achieved a successful certification was completed in May 1996.

Defense System. It provided valuable insight into the potential role of Human-In-The-Loop (HIL) for a TMD system. Also, the Test bed Product Office at the Space and Strategic Defense Command benefited from the application of ITB Project experience to the U.S. and United Kingdom Extended Air Defense Test Bed (EADTB) The ITB became operational in the second quarter of FY 1992. The ITB experiments validated the performance of the prospective near-term Israel Theater Missile

effort analyzed and addressed numerous TMD system issues including HIL, resource allocation, and threat analysis. The U.S. benefited from the architecture analysis The ISA&I Project activities demonstrated that defense of the State of Israel from tactical ballistic missile (TBM) attacks is feasible and cost-effective. The ISA&I work, including identification and progress toward resolution of critical TMD system issues such as kill assessment and the lethality study of a novel interceptor

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RD.	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	rry 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE and Validation 0603872C Joint Theater Missile Defense	PROJECT 2160
EY 1996 (\$ in Thousands): - \$31,493 Com - \$31,493 Initia Deve - \$24,075 Arro - \$1,911 ITB. - \$1,910 ITB. - \$1,666 ISA6 perfo archi - \$207 Coop	ands): Completed Arrow Continuation Experiments (ACES) and Support. Completed Arrow II interceptor design, degreterment and fabrication. Initiate Arrow Minterceptor flight tests. Continued to transfer Arrow data for risk reduction in the THAAD and SM-2 Block IVA programs. Developed and used high fidelity secker models to analyze seeker performance. Arrow Deployability Project and Support. Program implementation of procurement of long lead items. Conducted interoperability studies. ITB. Awarded contract for continuation of ITB effort. Initiated Adaptive Battle Management Center enhancements. ISA&I. Analyzed technical issues associated with TMD system performance including Kill Assessment and Lethality. Evaluated the performance of the near-term TMD against near-term and evolutionary threats. Awarded follow-on contract modification. Continued architecture analysis work for near term and future threats. Cooperative R&D. Identified and assessed key technologies. Assessed technologies and interoperability.	ication. programs. y studies. the
EY 1997 (\$ in Thousands): - \$1,701 ACE - \$38,653 Arrov syste - \$1,898 ITB.	ACES Support. Complete lethality analysis of Arrow II. Evaluate Arrow II performance against surrogate threat High Explosive and bulk chemical warhead targets. Complete analysis of Arrow II flight test data. Provide Arrow II flight data to U.S. TMD interceptor developers. Arrow Deployability Project and Support. Begin production of Arrow II UOES and targets. Evaluate Arrow interoperability with other TMD systems. Evaluate expected Arrow Weapon System (AWS) test performance. Provide AWS test plans and flight data to U.S. TMD developers. ITB. Complete Adaptive Battle Management Center enhancements. Conduct experiments on near-term improvements to the TMD system.	and bulk svelopers. other TMD ID developers. D system.
- \$1,498 - \$142 - \$43,892	ISA&I. Provide independent oversight and assessment of near-term TMD system to include capability conformance with operational requirements and test plan traceability with operational specifications. Conduct architecture effectiveness/cost/risk trade study to examine evolution from near-term TMD system. Gov Project Personnel & Support. Provide project support for USASSDC personnel. Total	nal xamine
EY 1998 (\$ in Thousands): - \$35,184 Arrov interf produ - \$1,894 Conti updat - \$1,495 ISA& ADP	ands): Arrow Deployability Project and Support. Continue AWS integrated flight tests. Evaluate U.S. and Arrow components for electro-magnetic interference. Transfer the results of the AWS tests to U.S. TMD interceptor developers. Continue interoperability, lethality, kill assessment and producibility studies. Develop an US/Israeli Interoperability Capability. Continue experiments on near-term improvements to the TMD system and on deployability. Provide improved threat model and Arrow II update enhancements. ISA&I. Analyze results of ITB Interoperability experiments. Continue evaluations of the performance of the near-term TMD system based on ADP system engineering flight tests. Continue analysis of TMD refinements for future threats.	o-magnetic ssessment and Атоw II
Project 2160	Page 39 of 120 Pages Exhibit R-2 (PE 0603872C)	'2C)

R	RDT&E BUDG TEEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE	February 1997
BUDGET ACTIVITY 4 - Demonstration	BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 1603872C Joint Theater Missile Defense	PROJECT 2160
- \$142 - \$38,715	Gov Project Personnel & Support. Provide project supp Total	Provide project support for USASSDC personnel.	
FY 1999 (\$ in Thousands): - \$35,137 Arrov	usands): Arrow Deployability Project and Support. Conduct Bene	unds): Arrow Deployability Project and Support. Conduct Benefits Review to determine future ADP plans. Continue AWS integrated flight tests.	grated flight tests.
- \$1,891	Continue transfer of the AWS test results to U.S. IMD sy Complete experiments on near-term improvements to the update enhancements. Conduct joint US/IS experiments.	Continue transfer of the AWS test results to U.S. 1MD systems. Continue interoperability, lethality, kill assessment and producibility studies. Complete experiments on near-term improvements to the TMD system and on deployability. Provide improved threat model and Arrow II update enhancements. Conduct joint US/IS experiments.	producibility studies. odel and Arrow II
- \$1,493 - \$141	Continue to analyze results of ITB Interoperability experiments. Continue performance e system engineering flight tests. Continue analysis of TMD refinements for future threats. Gov Project Personnel & Support. Provide project support for USASDC personnel.	Continue to analyze results of ITB Interoperability experiments. Continue performance evaluations of the near-term TMD system based on ADP system engineering flight tests. Continue analysis of TMD refinements for future threats. Gov Project Personnel & Support. Provide project support for USASSDC personnel.	D system based on ADP
- \$38,662	Total		
Acquisition Strategy: This is a castactof-the-art technical data for The planned ISA&I and ITB efforequirements and concept of open Agreements, share project costs. a firm-fixed price (FFP) contract.	y: This is a cooperative U.S./GOI development program. Inical data for program risk reduction and the GOI will have I and ITB efforts will continue to refine the operational tactionecept of operations needed for further acquisition strategy project costs. The U.S. share of total funding is based upon FFP) contract.	Acquisition Strategy: This is a cooperative U.S./GOI development program. By completing the Arrow Deployability Project, U.S. TMD programs will be afforded state-of-the-art technical data for program risk reduction and the GOI will have developed information to make a sound Arrow Weapon System deployment decision. The planned ISA&I and ITB efforts will continue to refine the operational tactics and techniques of the fielded near-term TMD system. The IBIS will provide requirements and concept of operations needed for further acquisition strategy development. The U.S. and the GOI, under the umbrella of the various Memoranda of Agreements, share project costs. The U.S. share of total funding is based upon the maturity of the development. Each contract associated with the individual projects is a firm-fixed price (FFP) contract.	rams will be afforded deployment decision. IS will provide various Memoranda of the individual projects is
B. Program Change	B. Program Change Summary (\$ in Thousands)		

B. Frogram Suange St

lotal	Cost	5,362	180,621	
			38,662	
	FY 1998	37,874	38,715	
	FY 1997	37,180	43,892	
	FY 1996	52,906	59,352	
		Previous President's Budget	Current Budget Submit/President's Budget	

Change Summary Explanation:

Israeli Cooperative programs at \$40M per year starting in FY1998. Inflation reductions impacted FY1998 and beyond to levels below the \$40M per year specified in the US/Israel Memorandum of Agreement (Kaminski-Eilam). Department of Defense-Wide RDT&E reductions. Negotiations for an extended ADP reduced the Cooperative R&D budget after the U.S.-GOI agreement to cap Funding: The FY1997 Congressional Appropriation contained an additional \$2.7M for the Israeli Cooperative Programs. The program was reduced by \$46K in

Schedule: Out of six flight tests planned in FY96, three occurred in FY96, and three will occur in FY97.

Project 2160

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RDT&E BUDGET IN	USTIFICATION SHEET (R-2 Exhibit)	bit)	DATE Feb	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint The	Joint Theater Missile Defense	JS.	РRОЈЕСТ 2160
Technical: None				
C. Other Program Funding Summary (\$ in Thousands)	isands)			
3359 - System Test & Evaluation, PE 603872C	EX 1996 FY 1997 FY 1998 FY 1999 FY 2000 33,568 42,792 40,307 26,444 25,763	EX 2001 EX 2002 27,750 27,090	EY 2003 27,136	To Total Compl Cost Cont Cont
D. Schedule Profile				
-	FY 1996 FY 1997 A 1 2 3 4 1	EY 1998 2 3 4	-	FY 1999 2 3 4
U.S./Israel ADP Agreement signed Complete Arrow Interceptor Development Complete ITB Enhancements Complete six Arrow II Flight Tests (ACES) Initiate Arrow Weapon System Flight Tests Initiate Interoperability Requirements Interoperability Tests U.S. Benefits Review	× × × × ×	×	×	×× ×
Project 2160	Page 41 of 120 Pages	Exhib	Exhibit R-2 (PE 0603872C)	603872C)
	UNCLASSIFIED			

RD	RDT&E PROGRAM ELEMENT/PROJECT	SRAM EL	EMENT/F	ROJECT		3REAKD	COST BREAKDOWN (R-3)	3)	DATE Fe	February 1997	266
BUDGET ACTIVITY 4 - Demonstration and Validation	ition and Va	lidation			PE NUMBER AND 0603872C	PE NUMBER AND TITLE 0603872C Joint	Theater M	DITILE Joint Theater Missile Defense	euse		РРОЈЕСТ 2259
A. Project Cost Breakdown (\$ in Thousands)	reakdown (S in '	Thousands)									
				FY 1996		FY 1997	FY 1998	EY 1999	C		
Prime Contract (Israel Ministry of Defense) Other U.S. Government Activities US Government Flight Test	ael Ministry of E ment Activities ight Test	(sefense)		19950 3975 31493		33,000 5,647 1,703	33,000 2,173 0	33,000 2,121 0	0 1 0		
Software Development Systems Engineering Miscellaneous	aent 1g			1911 1666 357 359	1911 1666 357 352	1,900 1,500 142 43,892	1,900 1,500 142 38 715	1,900 1,500 141 38 662	0 0 11 0		
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ition History an	d Planning In	formation (\$ i	n Thousands)	1				1		
Performing Organizations:	ıfzations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	ent Organizations	e/i									
Support and Management Organizations	gement Organiza	tions		•							
Test and Evaluation Organizations	1 Organizations										
B. Budget Acquisition History and Planning Information Continued (\$\int\$ in Thousands)	ition History an	d Planning In	formation Co	ıtinued (S in I	(housands)						
Government Furnished Property:	ished Property:										
Project 2259				Pa	Page 42 of 120 Pages	Pages		Ext	Exhibit R-3 (PE 0603872C)	0603872C	

RD	T&E PROG	RAM EL	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3	(1)	DATE F	February 1997	197
BUDGET ACTIVITY 4 - Demonstration and Validation	ition and Val	idation		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	heater Mi	PE NUMBER AND TITLE OG03872C Joint Theater Missile Defense		2	PROJECT 2259
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Delivery Date	Total Prior to F <u>Y</u> 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property	int Property									
Support and Management Property	ement Property									
Test and Evaluation Property	Property									i
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation Total Project	svelopment d Management valuation		•							
Project 2259			Pag	Page 43 of 120 Pages	ies		Exhit	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&E BUDGET ITEM	-	TIFICA.	TION S	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 090	PE NUMBER AND TITLE 0603872C Joint	TITLE oint The	E NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ile Defen	ıse	Z 0	РРОЈЕСТ 2259
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3153 Architecture Analysis / BMC3I Initiatives	9,738	6,799	8,273	660'8	8,058	8,020	8,011	8,026	8,026 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

Management/Command, Control, and Communications (BM/C3) are addressed in a coordinated and synergistic manner across all BMDO National Missile Defense (NMD) and Theater Missile Defense (TMD) efforts. The offices of Architecture Integrator and the BM/C3 Office report directly and independently to the BMDO This project, which began in FY95, supports two offices within BMDO to ensure that appropriate issues relating to system architecture and Battle Director to provide the necessary mission-area oversight of critical BMDO technical issues.

development. Computer simulation models are developed and used to investigate architecture and system level capability and to resolve critical technical issues related effectiveness of major programs under development and requirements for supporting technology. The work is separated into two program elements, one for TMD and to the development of specific elements of the architecture. Tradeoffs in alternative elements, specific designs, inventory and integration of systems are conducted in detail to determine the most cost effective approach for a particular missile defense mission. The work is performed on a continuing basis in order to determine the In this project, BMDO supports systems analysis work to determine the expected operational performance and effectiveness of missile defense systems under impact of changing threats, mission requirements, and advances in technology. The project provides BMDO with an independent assessment of the expected the other for NMD

performance of different defense systems under development to handle current and projected missile threats, both ballistic and cruise. Issues such as warhead lethality, system degradation in a severe countermeasure environment, target handover from tracking sensor to missile seeker, effects of netting sensors, etc. are some of the In this program element the focus is on TMD systems and technology. The primary thrust of the work is to show, through analysis, the need for and the expected technical issues addressed in this project. Future BM/C3 activities in this project will provide for the mission-area oversight and coordination of all BMDO BM/C3 development and acquisition activities. This appropriate reuse strategies to maximize BMD reuse capabilities; and minimize the duplication of BM/C3 research and development efforts across all NMD and TMD effort will provide for the synergistic evaluation of relevant BM/C3 technical issues; the formulation of appropriate plans, programs, and policies to facilitate the coordination of all BMD Advanced Development BM/C3 research, development, and acquisition activities across TMD and NMD program activities; promote development efforts.

Project 2259

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Exhibit R-2 (PE 0603872C)

RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation		t Theater Missile Defense	PROJECT 2259
FY 1996 (\$ in Thousands): - \$5,707 Arch (PRC unres coun of po - \$4,031 BM// resol resol requi parti initia comp type - \$9,738 Total	itecture Analysis: Perform GRUS III) to determine in solved technical issues identential termeasures. Studied activatential Russian and Allied C3 Initiatives: Provided th ution in a synergistic manivements to facilitate the tracipation in the analysis, deritives relating to BMDO Theonents, relative to TMD/N document to support cost a	ed analyses of architectures and systems using new (validated) simulation tools. Conducted 3 month study apact of any change in threat, requirements, or development programs on the TMD architecture. Analyzed tified in the TMD COEA Study. Determined the ability of TMD systems to respond to proposed e defense in the context of overall defenses including passive and counterforce options. Evaluate the capab missile defense systems with TMD systems. E mission-area capability to address emerging BM/C3 system requirements and concerns and facilitate their across all TMD and NMD development efforts. Defined TMD and NMD BM/C3 development process unslation of operational BM/C3 requirements to joint and combined interoperable systems. Coordinated BN-velopment, and implementation of various BMDO, DoD, Allied, and other Government and commercial AD/NMD BM/C3 development. Developed a concise definition of BM/C3 and a simple description of its find investment analysis.	ed 3 month study cture. Analyzed oposed valuate the capability and facilitate their clopment process Coordinated BMDO d commercial escription of its Document (CARD)
EY 1997 (\$ in Thousands): - \$4,591 Archi and re - \$2,208 BM/c mann intero cother - \$6,799 Total	Architecture Analysis: Conduct annual program update study (PROGRUS IV). Continue systems analysis of architecture/system performance and related technical issues as directed by the BMDO Architecture Integrator and the Deputy for Acquisition/TMD. BM/C3 Initiatives: Provide BMDO system-level capability to address emerging BM/C3 system requirements and concerns in a synergistic manner across all NMD and TMD development efforts and facilitate the translation of operational BM/C3 requirements to joint and combined interoperable systems. Coordinate BMDO participation in the analysis, development, and implementation of various BMDO, DoD, Allied, and other Government and commercial initiatives relating to BMDO NMD/TMD BM/C3 development. Total	S IV). Continue systems analysis of architecture tor and the Deputy for Acquisition/TMD. erging BM/C3 system requirements and concerranslation of operational BM/C3 requirements to evelopment, and implementation of various BM/MD BM/C3 development.	s/system performance is in a synergistic joint and combined DO, DoD, Allied, and
EY 1998 (\$ in Thousands): - \$5,295 and r - \$2,978 BM/(manu intero other	itecture Analysis: Conduc elated technical issues as das Initiatives: Provide BM her across all NMD and TN aperable systems. Coordin Government and commer	t annual program update study (PROGRUS IV). Continue systems analysis of architecture lirected by the BMDO Architecture Integrator and the Deputy for Acquisition/TMD IDO system-level capability to address emerging BM/C3 system requirements and concern AD development efforts and facilitate the translation of operational BM/C3 requirements to tate BMDO participation in the analysis, development, and implementation of various BMI cial initiatives relating to BMDO NMD/TMD BM/C3 development.	s/system performance is in a synergistic joint and combined DO, DoD, Allied, and
Project 2259	Page 45 of 120 Pages	Exhibit R-2 (PE 0603872C)	.0603872C)

RDT&E BUDGET ITEM JUS	USTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhib	-	DATE Fe	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603872C Joint	D TITLE Joint Theater Missile Defense	er Missile		PROJECT 2259
 £Y 1999 (\$ in Thousands): \$5,182 Architecture Analysis: Conduct annual program update study (PROGRUS IV). Continue systems analysis of architecture/system performance and related technical issues as directed by the BMDO Architecture Integrator and the Deputy for Acquisition/TMD. \$2,917 BM/C3 Initiatives: Provide BMDO system-level capability to address emerging BM/C3 system requirements and concerns in a synergistic manner across all NMD and TMD development efforts and facilitate the translation of operational BM/C3 requirements to joint and combined interoperable systems. Coordinate BMDO participation in the analysis, development, and implementation of various BMDO, DoD, Allied, and other Government and commercial initiatives relating to BMDO NMD/TMD BM/C3 development. \$8,099 Total 	al program update d by the BMDO A ystem-level capab velopment efforts MDO participatior itiatives relating to	study (PROGRI rchitecture Integility to address erand facilitate the	JS IV). Continurator and the Depmerging BM/C3 translation of opdevelopment, and BM/C3 development, and BM/C3 development.	e systems analy buty for Acquis system require erational BM/c i implementati elopment.	vsis of architecture/ition/TMD, ments and concern:	Conduct annual program update study (PROGRUS IV). Continue systems analysis of architecture/system performance sues as directed by the BMDO Architecture Integrator and the Deputy for Acquisition/TMD. vide BMDO system-level capability to address emerging BM/C3 system requirements and concerns in a synergistic of and TMD development efforts and facilitate the translation of operational BM/C3 requirements to joint and combined Coordinate BMDO participation in the analysis, development, and implementation of various BMDO, DoD, Allied, and commercial initiatives relating to BMDO NMD/TMD BM/C3 development.
Acquisition Strategy: Systems analysis work in this project is contracted. In November 1995, a two year competitive contract for this work (with two, one year extension options) was awarded to a ten-member corporate team led by SPARTA, Inc., Laguna Hills, Calif. For BM/C3 Initiatives efforts, expertise of Government, Federally Funded Research & Development Center (FFRDC), System Engineering and Integration Contractor (SEIC), and Scientific, Engineering and Technical Assistance (SETA) personnel are leveraged in the execution of project activities, using existing contracts to the maximum extent possible. Specifically, U.S. Army Space and Strategic Defense Command (USASSDC) and USAF/Electronic Systems Center (ESC) Government and contractor personnel lead Information Architecture and development efforts; SETA and SEIC contracts provide the core of technical expertise for a variety of BM/C3 activities; and Institute for Defense Analysis (IDA) contract vehicles provide state-of-the-art technical expertise in Software Engineering and related technical areas. Additional contractor services will be procured if needed to meet emerging program requirements.	is contracted. In team led by SPAR(C), System Engine of project activities SAF/Electronic Street of technic in Software Engine	November 1995, CTA, Inc., Lagun sering and Integrates, using existin ystems Center (Eical expertise for neering and relating and relati	a two year comp a Hills, Calif. Fo ation Contractor (g contracts to the SC) Government a variety of BM ed technical area	etitive contrac or BM/C3 Initia (SEIC), and Sc maximum ext and contractor (C3 activities; s s. Additional of	t for this work (wit ttives efforts, exper ientific, Engineerir ent possible. Speci r personnel lead In and Institute for De contractor services	th two, one year rtise of Government, ng and Technical ifically, U.S. Army nformation Architectucters can alysis (IDA) will be procured if
B. Program Change Summary (\$ in Thousands)						
Previous President's Budget Current Budget Submit/President's Budget	EX 1996 8,876 9,738	EX 1997 8,062 6,799	EY 1998 8,629 8,273	EY 1999 8,496 8,099	Total Cost Continuing Continuing	
Change Summary Explanation: Funding: None	•					
Schedule: None						
Technical: None						
Project 2259	Page	Page 46 of 120 Pages			Exhibit R-2 (PE 0603872C)	0603872C)
	ONO	UNCLASSIFIED	20			





RDT&E BUDGET ITEM J	THE	TSUL ME	IFICAT	ION SE	EET (R	USTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Fet	February 1997	[[
BUDGET ACTIVITY 4 - Demonstration and Validation	٦			PE NU 060	PE NUMBER AND TITLE 0603872C Join	D TITLE Joint Theater Missile Defense	ater Miss	ile Defer		2.	РКОЈЕСТ 2259
C. Other Program Funding Summary (S in Thousands)	n Thous	ands)									
2400 NMD Program PE 0603871C		EY 1996 730,656	EY 1997 828.864	EY 1998 504.091	FY 1999 393 085	FY 2000	FY 2001	FY 2002	FY 2003	To Compl	Total Cost
D. Schedule Profile									i	,	
	-	FY 1996	4	1 2	FY 1997 2 3	4	FY 1998	80 c.	-	FY 1999 2 3	4
Define BM/C3 elements Assess TMD/NMD/TAD Architectures Assess Global Command and Control System (GCCS) Interoperability in support of the Technical Architecture Develop Commander-in-Chief (CINC)/User BM/C3 Feedback Plan in support of the Technical Architecture Establish BMD BM/C3 CARD like document Establish Technical Architecture BM/C3 Policy Update Quarterly Program Review Annual Contract Program Review	×	× × ×	** *	× ×	×	× × ×	×	× × ×	×	× ×	× ×
Project 2259				Page 47 of 120 Pages	20 Pages			Exhibi	Exhibit R-2 (PE 0603872C)	303872C)	



RD	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	3RAM EI	EMENT/	PROJECT	COSTE	3REAKD	JWN (R-	3)	DATE	February 1997	997
BUDGET ACTIVITY 4 - Demonstr	DGET ACTIVITY - Demonstration and Validation	ılidation			PE NUMBE 060387	PE NUMBER AND TITLE 0603872C Joint	Theater M	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	İ	co della	PROJECT 3153
A. Project Cost Breakdown (\$ in Thousands)	reakdown (S in	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999	63		
Support Contracts Total				9,738	∞ ∞	6,799 6,799	8,273 8,273	8,099 8,099	6		
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ition History an	d Planning In	lformation (S i	n Thousands)							
Performing Organizations:	nizations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	ent Organizations	124									
Support and Management Organizations SETA CPFF/CPAF 27 Other Support Mu	gement Organizat CPFF/CPAF	<u>tions</u> 27 Dec 94 Multiple	вмро			2,916	1,750	2,500	2,500	continuing continuing	9,666
Test and Evaluation Organizations	1 Organizations			•							
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	ition History and	d Planning In	formation Con	ıtinued (S in Th	(spusands)						
Government Furnished Property:	ished Property:										
Project 3153				Page	Page 48 of 120 Pages	ages		Exh	ibit R-3 (PE	Exhibit R-3 (PE 0603872C)	

RDT&E PRO	GRAM ELI	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BE	EAKDO	WN (R-3		DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validati	alidati		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	heater Mi	DE NUMBER AND TITLE OE03872C Joint Theater Missile Defense	nse	PF 3	РРОЈЕСТ 3153
Contract Method/Type Item or Funding Description Vehicle	e Award Obligation Date	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property			·						
Support and Management Property	*								
Test and Evaluation Property									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation				9,738	6,799	8,273	8,099		32,909
Total Project		,		9,738	6,799	8,273	8,099		32,909
·									
Project 3153		Pag	Page 49 of 120 Pages	ges		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

RD	RDT&E BUDGET ITEM	_	TIFICA	TION SI	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fel	February 1997	26
BUDGET ACTIVITY 4 - Demonstration and Validation	and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	τιτιε I oint The α	PE NUMBER AND TITLE OG03872C Joint Theater Missile Defense	ile Defen	esı	T 69	РRОЈЕСТ 3153
COST (4	COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3157 Environmental, Siting, and Facilities	, and Facilities	4,369	5,972	3,600	3,640	3,631	3,609	3,606	3,612	Continuing	Continuing
A. Mission Description Provides environmer for the Ballistic Miss the Military Construct Environmental Impar	A. Mission Description and Budget Item Justification Provides environmental program guidance, environmental impact analyses and documentation, real property facility siting, acquisition, and facility operational support for the Ballistic Missile Defense Organization (BMDO) Theater Missile Defense (TMD) system. Plans, programs, budgets, and oversees facility acquisition through the Military Construction (MILCON) and RDT&E construction programs. Provides guidance and supports BMDO TMD Environmental Assessment and Environmental Impact Statement process, environmental compliance, pollution prevention, and other environmental efforts for TMD activities. Develops guidance for Executing Assessment and environmental matters.	ation vironmental i (BMDO) The [&E construc ronmental co on, and envir	ental impact analyses an)) Theater Missile Defenstruction programs. Protal compliance, pollutical environmental matters.	ses and docu Defense (Ti ns. Provides ollution prev	umentation, I MD) system s guidance a rention, and	real property . Plans, prog nd supports l	facility sitin grams, budge BMDO TMI nmental effo	g, acquisitic ts, and over) Environme rts for TMD	on, and facili sees facility ental Assessr activities.	ity operation: acquisition t ment and Develops gui	il support irough dance for
EY 1996 (\$ in Thousands): - \$3,378 and p (PAC) - \$77 Cond	Supported TMD programs with siting analyses, basing deployment plans, environmental analyses and documentation, environmental compliance and pollution prevention programs, and test range studies. TMD systems being emphasized are the PATRIOT Advance Capability Level 3 (PAC-3), Theater High Altitude Area Defense (THAAD), Navy Lower Tier (Area) systems and Family of Systems System Integration Tests. Conducted facility planning and developed preliminary facility design concepts for TMD test and evaluation facilities, and for deployment	ns with siting programs, an Altitude Area ing and devel	analyses, bæ d test range Defense (TF oped prelim	asing deploy studies. The AAAD), Na- unary facility	ment plans, AD systems vy Lower Ti y design con	environment being empha ier (Area) sy-	siting analyses, basing deployment plans, environmental analyses and documentation, environmental compns, and test range studies. TMD systems being emphasized are the PATRIOT Advance Capability Level 3 Area Defense (THAAD), Navy Lower Tier (Area) systems and Family of Systems System Integration Teadeveloped preliminary facility design concepts for TMD test and evaluation facilities, and for deployment	and documer PATRIOT mily of Sysivaluation fa	ntation, envii Advance Ca tems System cilities, and	ronmental co pability Leve Integration for deploym	mpliance al 3 Fests.
- \$914 - \$4,369	nocations. Executed and managed TMD's FY 96-98 MILCON, Minor MILCON, and RDT&E facility design, construction projects, and related activy The emphasis is on the PAC-3 and THAAD EMD test and deployment facilities, such as THAAD Test Facilities at USAKA, TMD Target Launch Facilities at Wake Island and Fort Wingate, and THAAD 1st Objective Battalion Facilities at Fort Bliss. Total	FMD's FY 96 AC-3 and TF e Island and	-98 MILCO IAAD EMD Fort Wingat	N, Minor M test and deg e, and THA	ILCON, and ployment fac AD 1st Obje	l RDT&E fac zilities, such ctive Battalio	FY 96-98 MILCON, Minor MILCON, and RDT&E facility design, construction projects, and related activities. and THAAD EMD test and deployment facilities, such as THAAD Test Facilities at USAKA, TMD Target d and Fort Wingate, and THAAD 1st Objective Battalion Facilities at Fort Bliss.	construction Fest Facilitic at Fort Bliss	n projects, an es at USAK/ i.	nd related ac A, TMD Targ	ivities. et
FY 1997 (\$ in Thousands): - \$1,878 Supp and p syste - \$144 Conti	Support TMD programs with siting analyses, basing deployment plans, environmental analyses and documentation, environmental compliance and pollution programs, and test range studies. The project covers costs associated with maturing acquisition programs, fielding of systems, integrated system testing, and test and evaluation programs. Continues facility planning for fielding the PAC-3 and THAAD systems. It also continues facility planning support for test and evaluation programs.	with siting ar programs, ar m testing, an ng for fieldin	nalyses, basi dd test range I test and ev g the PAC-3	ng deployme studies. Th aluation pro 3 and THAA	ent plans, en te project co grams. D systems.	vironmental vers costs as: It also contii	ting analyses, basing deployment plans, environmental analyses and documentation, environmental complia ms, and test range studies. The project covers costs associated with maturing acquisition programs, fielding ng, and test and evaluation programs. If also continues facility planning support for test and evaluation fielding the PAC-3 and THAAD systems.	i documenta 1 maturing a planning suj	ttion, enviror cquisition pr pport for test	nmental com ograms, fiel t and evaluat	
Project 3153				Page 50 of 120 Pages	120 Pages			Exhib	Exhibit R-2 (PE 0603872C)	0603872C)	



	RDT&E BUDGET ITEM JUSTIFICATIO	JUSTIFICATION SHEET (R-2 Exhibit)	DATE Francisco 1997
BUDGET ACTIVITY 4 - Demonstrati	BUDGET ACTIVITY 4 - Demonstration and Valesation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	PROJECT 8153
- \$3,915 - \$35 - \$5,972	Provides funds to execute and manage TMD's FY 97-99 MILCON, Minor MILCON, and RDT&E facility design, composition other related activities providing program support. Design projects include: the THAAD Test Facilities at USAKA, Faculty Upgrades at Pacific Missile Range Facility (PMRF), Utilities Repairs at Wake Island, Extended Range Target Launch Complex facilities, and possible Air Launch facilities in the Pacific. Construction projects include PAC-3, THAAD, and Navy Lower Tier (Area) facility projects, such as: TMD Target Launch Facilities at Wake Island and Fort Wingate, and construction of THAAD 1st Objective Battalion Facilities at Fort Bliss. OSD and SBIR Reductions	by MILCON, Minor MILCON, and RDT&E I sign projects include: the THAAD Test Faciliake Island, Extended Range Target Launch C PAC-3, THAAD, and Navy Lower Tier (Aread construction of THAAD 1st Objective Batts	acility design, composed and ties at USAKA, Facility Upgrades at Pacific omplex facilities, and possible Air Launch) facility projects, such as: TMD Target lion Facilities at Fort Bliss.
EY 1998 (\$ in Thousands): - \$1,784 Suppo	ort TMD programs with si ollution prevention progra	eployment plans, environmental analyses and lies. Begin work on the System Integrated Te	documentation, environmental compliance sts requirements development and continue
- \$62 - \$1,754	on the Navy Lower Tier (Area), THAAD and PAC-3 systems. The program manages activities associated with maturing acquisition programs, fielding of systems, integrated system tests, and test and evaluation programs. Complete facility planning for PAC-3 and THAAD facilities. Begin planning and development of unique range test facilities for both Atlantic and Pacific requirements. Complete planning for the FY00 and FY01 System Integration Tests. Provides funds to execute overall FY98-00 MILCON, Minor MILCON, and RDT&E facility design, construction projects and related activities. Construction projects include: THAAD Test Facilities at USAKA, Utilities Repairs at Wake Island, and Facility Upgrades at PMRF. Continual improvements to TMD's test and evaluation facilities are required to support the ever increasing complexity of test scenarios. Initial	THAAD and PAC-3 systems. The program manages activities associated with maturing acquisition programs, system tests, and test and evaluation programs. PAC-3 and THAAD facilities. Begin planning and development of unique range test facilities for both Atlantic plete planning for the FY00 and FY01 System Integration Tests. II FY98-00 MILCON, Minor MILCON, and RDT&E facility design, construction projects and related activitie: FHAAD Test Facilities at USAKA, Utilities Repairs at Wake Island, and Facility Upgrades at PMRF. Continual devaluation facilities are required to support the ever increasing complexity of test scenarios. Initial	ciated with maturing acquisition programs, nique range test facilities for both Atlantic, construction projects and related activities. and Facility Upgrades at PMRF. Continual plexity of test scenarios. Initial
- \$3,600	requirements to meet improvements to PAC-3, THAAD and Navy Lower Tier (Area) system will enter the design phase. Total	D and Navy Lower Tier (Area) system will e	iter the design phase.
FY 1999 (\$ in Thousands): - \$1,800 Suppo and p	Support TMD programs with siting analyses, basing deployment plans, environmental analyses and documentation, environmental compliance and pollution prevention programs, and test range studies. Work continues on new TMD requirements as well as on Navy Lower Tier (Area), Navy Upper Tier (Theater Wide), THAAD, and PAC-3 systems to meet their requirements. The program manages activities associated with	eployment plans, environmental analyses and ies. Work continues on new TMD requireme 3 systems to meet their requirements. The pro-	documentation, environmental compliance nts as well as on Navy Lower Tier (Area), gram manages activities associated with
- \$63	maturing acquisition programs, fielding of systems, integrated system tests, and test and evaluation programs. Complete facility planning for PAC-3 and THAAD basic system facilities. Continue planning and development of unique range test fac both Atlantic and Pacific requirements as well as follow-on improvements to THAAD and the Navy Upper Tier (Theater Wide) systems	regrated system tests, and test and evaluation sic system facilities. Continue planning and cwon improvements to THAAD and the Navy	fielding of systems, integrated system tests, and test and evaluation programs. PAC-3 and THAAD basic system facilities. Continue planning and development of unique range test facilities for ements as well as follow-on improvements to THAAD and the Navy Upper Tier (Theater Wide) systems.
- \$1,777	Complete planning for the FY00 and FY02 System integration Tests. Provides funds to execute overall FY98-00 MILCON, Minor MILCON, and RDT&E design and construction. The design emphasis will be on completing facility requirements for PAC-3. Provides for TMD test and evaluation facilities improvements to support increasingly complex test scenarios. Final requirements to meet improvements to PAC-3, THAAD and Navy Lower Tier (Area) system will enter the design phase. The construction emphasis will be on the Facility Upgrades at PMRF.	egration 1 ests. Minor MILCON, and RDT&E design and co for TMD test and evaluation facilities improv o PAC-3, THAAD and Navy Lower Tier (Are s at PMRF.	nstruction. The design emphasis will be on ements to support increasingly complex test a) system will enter the design phase. The
- \$3,640	Total		
Project 3153	Page	Page 51 of 120 Pages	Exhibit R-2 (PE 0603872C)

RDT&E BUDGET ITEM JU	STIFICATIO	JUSTIFICATION SHEET (R-2 Exhibit)	R-2 Exhit	₽		DATE	February 1997	
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	TITLE Joint Thea	iter Missil	le Defen	1	135 PR 31	PROJECT 3153
Acquisition Strategy: BMDO is assisted by executing agents in the Army, Navy, Air Force and contractor support. They provide technical assistance of facilities, siting, and environmental activities. The U.S. Army Space and Strategic Defense Command, U.S. Army Corps of Engineers, the U.S. Army Program Executive Office-Missile Defense and Navy PEO Theater Air Defense provide specific additional technical assistance in delivering the Facilities, Siting, and Environmental documentation products needed for program execution. BMDO tasks the Services through Program Management Agreements to perform the required tasks in support of the TMD program. BMDO performs quarterly on-site reviews to verify and validate completed tasks.	ents in the Army, P e and Strategic Del vide specific addition BMDO tasks the Se reviews to verify a	agents in the Army, Navy, Air Force and contractor support. They provide technical assistance of facilities, pace and Strategic Defense Command, U.S. Army Corps of Engineers, the U.S. Army Program Executive Of Novide specific additional technical assistance in delivering the Facilities, Siting, and Environmental and Services through Program Management Agreements to perform the required tasks in supsite reviews to verify and validate completed tasks.	contractor sup S. Army Corp ance in deliver gram Manager ted tasks.	pport. They ps of Engineer ring the Facil	orovide tecl s, the U.S. ities, Siting ents to perf	nnical assistan Army Progran ,, and Environ orm the requin	ce of faciliti n Executive mental red tasks in a	es, Office- support
B. Program Change Summary (\$ in Thousands)								
Previous President's Budget Current Budget Submit/President's Budget	EY 1996 3,399 4,369	FY 1997 3,768 5,972	EY 1998 3,754 3,600	FY 1999 3,818 3,640		Total <u>Cost</u> 14,739 17,581		
Change Summary Explanation: Funding: Funding adjustments in FY97 made to support additional environmental analysis requirements.	ort additional envii	ronmental analysis	equirements.					
Schedule: None								
Technical: None								
C. Other Program Funding Summary (\$ in Thousands)								
1157 Minor MILCON & Design, Joint TMD 1,642 Dem/Val, PE 0603872C	EY 1997 1,404	EV 1998 EV 1999 1,965 1,885	<u>FY 2000</u> 1,444	FY 2001 341	FY 2002 1,643	EY 2003 1,650	To Compl Cont.	Total Cost Cont
D. Schedule Profile								
FY 1996 1 2 3 PAC-3 and THAAD Target Launch X X X Facilities, Ft Wingate and Wake Island	96 X X X 4 1	EY 1997 2 3	1	FY 1998 2 3	4	1 2	FY 1999 2 3	4
Project 3153	Page	Page 52 of 120 Pages			Exhibit	Exhibit R-2 (PE 0603872C)	3872C)	

RDT&E BUDGET ITEM	E	•	JSTII	-ICA	NO	JUSTIFICATION SHEET (R-2 Exhibit)	ET (F	₹-2 E	xhibi	t)			DATE Fe	February 1997	1997	
BUDGET ACTIVITY 4 - Demonstration and Valida						PE NUMBER AND TITLE 0603872C Join	ER AND 72C	ЭТІТІЕ Joint Theater Missile Defense	Theat	er Mis	sile D	efens			PROJE(3153	PROJECT 3153
PAC-3 Missile Assembly Bldg, White		Z ×	7 <u>1996</u> 3 X	4 X	-×	EY 1997 2 3 X 3	297 × 3	4	-	EY 1998 2 3	3 200	4	-	FY 1999 2 3	3 10	4
Sands Missile Range THAAD Test Facilities, Kwajalein Atoll THAAD 1st Objective Battalion, Ft Bliss Manage Environmental Analysis for Eglin			×	×××	×××	\times	×××	×××	×××	× ×	×	×				
Gulf Test Range Manage Environmental Analysis for Pacific Missile Range Facility Manage Environmental Analysis for Alternate Air Launch			×	× ×	× ×	× ×	× ×	×	×	×	×	×				
					,											
Project 3153					Page 53	Page 53 of 120 Pages	Pages					Exhibit	R-2 (PE	Exhibit R-2 (PE 0603872C)	<u>()</u>	
				J	NCL/	UNCLASSIFIED		∞ ∞ 70								

RD	RDT&E PROGRAM ELEMEI	SRAM EL		NT/PROJECT	COSTB	REAKD	COST BREAKDOWN (R-3)	3)	DATE Fe	February 1997	26
BUDGET ACTIVITY 4 - Demonstration and Validation	ition and Va	lidation			PE NUMBER ANI 0603872C	PE NUMBER AND TITLE 0603872C Joint	Theater M	ਹ ਸਾ∟E Joint Theater Missile Defense		<u> </u>	PROJEСТ 3157
A. Project Cost Breakdown (\$ in Thousands)	eakdown (S in	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999			
Environmental, Siting & Facilities Total	ng & Facilities			4,369 4,369		5,972 5,972	3,600	3,640 3,640			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	tion History and	d Planning Iní	formation (\$ i	1 Thousands)							
Performing Organizations: Contractor or Contractor or Method	izations: Contract	v Prom V		d.	E E						
Performing Activity	or Funding Vehicle	Awalu of Obligation Date	Activity EAC	riojeci Office EAC	Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	nt Organizations	- Al									
AF/SMC Huntsville Corps	PMA MIPR	FY96 FY95				25	130	130	10	Cont.	55
of Engr Navy Civil	СРFF	FY94				7.6	9	9	2	to	177
Engr/Environ	;					ì	3	8	3	Com:	
Pac Ocean Div	MIPR	FY97				0	1,600	0	0	Cont.	1,600
Corp of Engr USASSDC	CPFF	FY96				125	0	279	588	Cont	992
Fish & Wildlife	MIPR	FY92				9	30	0	0	Cont.	36
Service WSMR Environ	MIPR	FY96				225	175	0	0	Cont	400
Staff						;	,	,			
MICOM-RUEC PEO AMP. TSD.	MIPK	FY96 FV96				52	25	25	25	Cont.	001
Civil		0/11				QC.	OS.	OS.	30	Cont.	071
Project 3157				Page	Page 54 of 120 Pages	ages		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

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RDI	RDT&E PROG	PROGRAM ELEME	EMENT/P	NT/PROJECT (COST BREAKDOWN (R-3)	REAKDC)WN (R∹	3)		February 1997	161
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Val	lidation			PE NUMBER AND TITLE 0603872C Joint	C Joint T	Theater M	этте Joint Theater Missile Defense	ense	T 63	РRОЈЕСТ 3157
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FX 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total <u>Progra</u> m
and Manage SSDC) 1D-TSD	ement Organizati CPFF CPFF	ions FY <i>97</i> FY95				488	450 130	445 130	445 130	Cont.	1,828
Support MEVATEC USASSDC	CPFF CPFF	FY96 FY94				100 983	100 1,929	100 1,078	100 757	Cont.	400
Environ. Support Navy Environ.	CPFF	FY97				0	275	274	280	Cont.	829
Support SETA (BMDO)	CPFF	FY95				2,001	1,038	1,049	1,095	Cont.	5,183
Test and Evaluation Organizations B. Budget Acquisition History and Planning Informati Government Furnished Property: Contract Method/Type Award or Method/Type Obligation Delia	Organizations tion History and shed Property: Contract Method/Type	d Planning Info Award or Obligation	ormation Con	ion Continued (\$ in Thousands) Tot	ousands) Total Prior to	Budget	Budget	Budget	Budget	Budget to	Total
Description Vehicle Product Development Property	Vehicle nt Property	Date	Date		FY 1996	FY 1996	FY 1997	FY 1998	FY 1999	Complete	Program
Support and Management Property	ement Property										
Test and Evaluation Property Project 3157	Property			Page	Page 55 of 120 Pages	ıges		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	
				ONC	UNCLASSIFIED	~ 0:					

RDI	T&E PROG	RAM EL	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BE	EAKDO	WN (R-3		DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation		PE NUMBER AND TITLE 0603872C Join	AND TITLE C Joint T	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ssile Defe		3 2	РВОЈЕСТ 3157
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	velopment d Management valuation				630 3,739	2,050 3,922	524 3,076	833 2,807		4,037 13,544
Total Project					4,369	5,972	3,600	3,640		17,581
·										5
Project 3157			Page	Page 5 6 of 120 Pages	es		Exhit	Exhibit R-3 (PE 0603872C)	0603872C)	

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RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	EM JUS	TIFICA	FION SE	HEET (R	-2 Exhil	bit)		DATE FeI	February 1997	26
BUDGET ACTIVITY 4 - Demonstration and Validation	ו and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ater Miss	ile Defer		3	PROJЕСТ 3157
COST	COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3160 TMD Readiness		1,112	1,709	1,730	1,692	1,687	1,676	1,674	1,677	Continuing	Continuing
A. Mission Description This project suppor diverse functions m between the Service logistics, metrology manufacturing (P&) affordability objectials of focus on the identification of the identificati	A. Mission Description and Budget Item Justification This project supports Theater Missile Defense projects in the functional areas of manufacturing, logistics supportability and metrology design and support. These diverse functions map directly into meeting operational suitability and affordability goals. By focusing on all TMD (BMD) activities and coordinating these efforts between the Services and projects, common cost avoidance is realized. TMD readiness activities include producibility and planning for manufacturing, acquisition logistics, metrology, and training. The efforts will concentrate on identifying and analyzing critical TMD systems level deployment, support, producibility and manufacturing (P&M) risks, industrial base capability issues and developing mitigation plans for these areas to ensure operational requirements and BMDO affordability objectives are met. In addition, TMD operational suitability and availability advances and lessons learned are applied to NMD projects. This effort will also focus on the identification of critical TMD metrology requirements; and the development of national/DOD measurement standards and calibration support for TMD technology and acquisition programs.	ation projects in the stational suitt st avoidance will concentre ability issues MD operation metrology re	e functional ability and a libility and a is realized. The on identify and develonal suitability equirements.	areas of man frordability. TMD readin fying and ar ping mitigat y and availa; and the dev	nufacturing, goals. By ft tess activitie alyzing crition plans foi bility advanvelopment of	logistics sup scusing on al s include pro ical TMD sy r these areas ces and lesso f national/DC	portability a II TMD (BM oducibility a stems level to ensure op ons learned a OD measure	nd metrolog D) activities nd planning leployment, erational rec re applied to	y design and coordir and coordir for manufact support, pro quirements a NMD projects and calib	d support. Ti nating these of turing, acqui oducibility an and BMDO ects. This efi oration suppo	hese efforts sition id fort will rt for
EY 1996 (\$ in Thousands): - \$723 Comp (NIST) optics	Completed development of Long Wave Infrared (LWIR) transfer standard detectors. Continued National Institute of Standards & Technology (NIST) support of THAAD Radar antenna calibration and field diagnostics. Continued development of IR standards for detectors, sources, optical materials characterization, and focal plane arrays (FPA). Continued to support the TMD program offices, their contractors, Government services	of Long Wav D Radar anterization, and	e Infrared (I anna calibrat focal plane	LWIR) transtion and field arrays (FPA	fer standard d diagnostice). Continue	detectors. Cs. Continuecd to support	Continued Na I developme the TMD pr	ational Instit nt of IR stan ogram office	ute of Stand idards for de	lards & Techi stectors, soure tractors, Gov	nology ces, ernment
- \$349	Integrated producibility issues. Resolved TMD system common suppo-	ssues. Resolv D wide). Rev	ved TMD sy	stem commufacturing p	on support a	nd producib	ility problen	is. Develop	ed mitigation	Resolved TMD system common support and producibility problems. Developed mitigation strategies (both). Reviewed manufacturing planning.	both
- \$40	Updated operational suitability planning, to address issues related to TMD concepts of operations, BM/C3, inter-Service operations, and systems readiness and functional requirements.	ibility plannii requirements	ng, to addre	ss issues rela	ited to TMD	concepts of	operations,	BM/C3, inte	r-Service op	erations, and	l systems
- \$1,112	Total	•									
FY 1997 (\$ in Thousands):	isands):										
8088 –	Complete the NIST medium background IR calibration facility. Continue development of IR standards for MWIR detectors, focal plane array testing, and IR filter measurements. Continue NIST support of THAAD Radar antenna field diagnostics and calibration. Continue to support	um backgrou surements. C	nd IR calibr	ation facility T support o	y. Continue f THAAD R	developmen	it of IR stand a field diagn	lards for MV ostics and ca	VIR detector libration. C	rs, focal plan	e array ıpport
- \$485	the TMD program offices, their contractors, Government laboratories and test centers with IR calibration and measurement services. Support completion and insertion of producibility and manufacturing mitigation programs developed in FY95 and 96, including non-BMDO programs. Support element program offices in risk mitigation development and assessment.	s, their contra insertion of p ent program o	ctors, Gove roducibility offices in ris	rnment labo and manufa k mitigation	ratories and cturing miti developmer	test centers a gation progra it and assessi	with IR calib ams develop ment.	ration and n ed in FY95 a	neasurement and 96, inclu	t services. ıding non-Bî	MD0
Project 3157				Page 57 of 120 Pages	120 Pages			Exhib	Exhibit R-2 (PE 0603872C)	0603872C)	

RD	RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit) DATE Fe	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	PROJECT 3157
- \$416 - \$1,709	Update operational suitability planning, to address issues readiness and functional requirements. Total	anning, to address issues related to TMD concepts of operations, BM/C3, inter-Service operations, and systems ments.	ations, and systems
FY 1998 (\$ in Thousands): - \$820 Composter	unds): Complete Medium Wave Infrared (MWIR) detector transf of standards for testing IR focal plane arrays and IR scene	Complete Medium Wave Infrared (MWIR) detector transfer standard and standards for IR filter spectral measurements. Continue development of standards for testing IR focal plane arrays and IR scene projections. Continue NIST support of THAAD. Continue to support the TMD	ntinue development pport the TMD
- \$490	program offices, their contractors, Covernment laboratorie Continue insertion of producibility and manufacturing mit and manufacturing aspects of PATRIOT Advanced Capab	program offices, their contractors, Government taboratories and test centers with IR calibration and measurement services. Continue insertion of producibility and manufacturing mitigation programs from FY97, including non-BMDO programs, support producibility and manufacturing aspects of PATRIOT Advanced Capability Level 3 (PAC-3) and Sea-based Area TBMD milestones. Support element	pport producibility pport element
- \$420	program offices in development of exit criteria resolution and assessment. Update operational suitability planning, to address issues related to TMD of readiness and functional requirements. Complete plans for the transition of BMDO to the Services.	program ornces in development of exit criteria resolution and assessment. Update operational suitability planning, to address issues related to TMD concepts of operations, BM/C3, inter-Service operations, and systems readiness and functional requirements. Complete plans for the transition of system management of current TMD acquisition programs from BMDO to the Services.	ations, and systems programs from
- \$1,730	Total		
FY 1999 (\$ in Thousands):			
- \$811	Continue MWIR/LWIR detector transfer standard and standards for IR filter spectral measurements, testing IR focal plane arrays and IR scene projections. Continue NIST support of THAAD. Continu contractors, Government laboratories and test centers with IR calibration and measurement services.	Continue MWIR/LWIR detector transfer standard and standards for IR filter spectral measurements. Continue development of standards for testing IR focal plane arrays and IR scene projections. Continue NIST support of THAAD. Continue to support the TMD program offices, their contractors, Government laboratories and test centers with IR calibration and measurement services.	of standards for rogram offices, their
- \$461	Continue insertion of producibility and manufacturing mit and manufacturing aspects of PAC-3 and Sea-based Area association and assessment	Continue insertion of producibility and manufacturing mitigation programs from FY97, including non-BMDO programs; support producibility and manufacturing aspects of PAC-3 and Sea-based Area TBMD milestones. Support element program offices in development of exit criteria	pport producibility tent of exit criteria
- \$420	Update operational suitability planning, to address issues readiness and functional requirements. Complete plans for BMDO to the Services.	Update operational suitability planning, to address issues related to TMD concepts of operations, BM/C3, inter-Service operations, and systems readiness and functional requirements. Complete plans for the transition of system management of current TMD acquisition programs from BMDO to the Services.	ations, and systems 1 programs from
- \$1,692	Total		
Acquisition Strategy: a. Efforts to Center in Newark OH. The AF Me	Acquisition Strategy: a. Efforts to develop and implement metrology standards will b Center in Newark OH. The AF Metrology Center staff also have the responsibility of	Acquisition Strategy: a. Efforts to develop and implement metrology standards will be executed by the NIST. BMDO funding will be administered by the AF Metrology Center staff also have the responsibility of helping BMDO identify metrology needs and implementing and distributing developed	the AF Metrology distributing developed

standards through-out US industry.

b. Efforts in producibility and manufacturing, industrial base analyses, and operational suitability will be worked through a series of government managed working groups and IPTs. Efforts may be executed by BMDO SETAs, Service Industrial base Analyses organizations, Service training and planning organizations. Unless a significant,

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Project 3157

Exhibit R-2 (PE 0603872C)





RDT&E BUDGET ITEM JUSTI	FICATION	USTIFICATION SHEET (R-2 Exhibit)	-2 Exhib	it)		DATE Febr	February 1997	
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	गा∟E oint Thea	ter Missile	Defens	1	PROJECT 3157	ECT 7
multi-year effort is required on a particular issue, these areas will be worked via MIPRs to services and by funding tasks with existing BMDO and service SETAs. These limited funds will go to the organization with the expertise on a topic -by-topic basis.	worked via MII c -by-topic basis	Rs to services and	d by funding	asks with exis	ting BMD	O and service	e SETAs. The	sse
B. Program Change Summary (\$ in Thousands)								
Previous President's Budget Current Budget Submit/President's Budget	FX 1996 1,106 1,112	EY 1997 1,822 1,709	EY 1998 1,805 1,730	FY 1999 1,776 1,692		Total Cost 6,509 6,243		
Change Summary Explanation: Funding: None								
Schedule: None								
Technical: None								
C. Other Program Funding Summary (\$ in Thousands)	•							····
EY 1996 I	EY 1997 FY 1998	998 FY 1999	FY 2000	FY 2001 E	FY 2002	FY 2003	To Compl	Total Cost
D. Schedule Profile								
FY 1996 1 2 3 IR and improved IR dynamic range spectral calibration services are provided throughout other milestones (TBD)	4	FY 1997 2 3	4	FY 1998 2 3	4	1 2 E	FY 1999 2 3	4
Project 3157	Page 5	Page 59 of 120 Pages			Exhibit	Exhibit R-2 (PE 0603872C)	33872C)	

RDT&E BUDGET ITEM		TIFICA	TION SI	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fek	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	E NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ater Miss	ile Defen	esi	E 6	PROJЕСТ 3160
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3251 Systems Engineering and Technical Support	45,358	50,909	65,260	62,031	66,972	69,350	90,554	76,498	76,498 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

This project provides system engineering and technical support for the integration of Service-supplied weapon systems to facilitate the identification and resolution of assessment; risk reduction and acquisition streamlining support; modeling, simulation, experiment, and flight test support; development and maintenance of technical and programmatic databases, and preparation of technical reports, briefings, and programmatic documentation associated with TMD studies and critical issues. architectures and concepts; support for UK developed sensor data fusion methodology; Ballistic Missile Defense (BMD) system survivability oversight and inter-Service integration and interoperability issues; technical and engineering assessments and trade-off studies of Theater Missile Defense (TMD) system

FY 1996 (\$ in Thousands):

ı	- \$2,470	Supported completion of a UK developed concept of operations test bed. Support continued in the testing and fielding of the UK developed
		Target Oriented Tracking System (TOTS).
I	\$9,775	Provided scientific, engineering, and technical support for the acquisition, integration, and fielding of TMD systems including: reviewed
		products in comparison to standards, specifications, and requirements; provided modeling and simulation support of architecture analyses and
		trade-off studies; installed and completed operational configuration of the BMDO node of the Extended Air Defense Test Bed (EADTB);
		continued analytic and programmatic support of the TMD Capstone Cost and Operational Effectiveness Analysis (COEA); provided risk
		reduction and acquisition streamlining support; provided engineering and technical support for international programs and BM/C3 efforts;
		developed and maintained technical and programmatic databases; and prepared technical reports, briefings, and programmatic documentation.
ı	\$814	Provided support to WALEX, THAAD, HAWK and TMD Conference
1	\$13,856	Using Federally Funded Research and Development Center (FFRDC) resources, performed independent technical and engineering assessments
		of TMD system architectures including: system concept development and assessment; COEA support; critical element technical and
		Diogrammatic assessments including trade-off analyses: reviews of mandated documents international connerative accordance and transitional

identify inter-Service integration interfaces; prepared engineering documents that identify changes required in theater air defense C31 systems to incorporate TBMD; updated TMD Integrated Test Plan; updated system description documents; completed TMD integration trade studies; and Provided minimum-level system engineering and integration support at the TMD system level to include the following efforts: continued to implications; multi-Service and allied BM/C3 integration; modeling, simulation, experiment and flight test support; integration of fielded Provided technical support to the TMD COEA, individual system COEAs, and congressionally-directed studies. planned, coordinated, and analyzed C2 wargames for CINC CONOPS development. components into operational units; specific studies and analyses of critical issues. \$9,596 \$3,728

Project 3160

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Exhibit R-2 (PE 0603872C)

RE	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	n and Validation PE NUMBER AND TITLE PROJECT 0603872C Joint Theater Missile Defense 3160
- \$1,794 - \$1,500 - \$1,374 - \$1,374 - \$351	Provided continued support to intra-Service integration, interoperability, and resolution of interlace issues; supported review of SEI contractor integration and assessment documentation; evaluated threat-generated requirements; initiated environmental modeling and simulation tool improvements; continued refinement of Survivability Enhancement Options (SEOs) for BM/C3; supported the EADTB effort and supported the Joint Surveillance and Target Attack Radar System (JSTARS) effort. Provided technical support to Combat Developments Directorate-Ft Bliss, TX. Supported BMDO services (e.g., security, contracting, supplies). Supported BMDO operations and personnel management. Provided personnel management support to Program Executive Officer, Missile Defense, Huntsville, AL.
FY 1997 (\$ in Thousands): - \$1,107 Cont TOT - \$442 Provi	nue UK sensor data fusior S applications. Begin use o
- \$8,953	Provide scientific, engineering, and technical support for the acquisition, integration, and fielding of TMD systems including: review of products in comparison to standards, specifications, and requirements; modeling and simulation support of architecture analyses and trade-off studies; risk reduction and acquisition streamlining support; engineering and technical support for international programs and BM/C3 efforts; conduct EADTB distributed analyses and operations; development and maintenance of technical and programmatic databases; and preparation of technical reports, briefings, and programmatic documentation.
- \$13,781 - \$1,879	Using FFRDC resources, perform independent technical and engineering assessments of 1MD system architectures including: system concept development and assessment; critical element technical and programmatic assessments including trade-off analyses; reviews of mandated documents, international cooperative programs, and treaty implications; multi-Service and allied BM/C3 integration; modeling, simulation, experiment and flight test support; integration of fielded components into operational units; and specific studies and analyses of critical issues. Provide technical support to the TMD Joint Effectiveness Analysis (JEA), individual system JEAs, and congressionally directed studies.
- \$11,695	Increase system engineering and integration support at the TMD system level. Continue to identify inter-Service integration interfaces; prepare engineering documents to identify changes required in theater air defense C3I systems to support TBMD; update TMD Integrated Test Plan; update system description documents; and plan, coordinate, and analyze C2 wargames for CINC CONOPS development.
- \$4,608	Provide support to Service integration, interoperability, and resolution of interface issues; determine adequacy of uneshold objective naturess specifications for C4I support equipment; identify SEOs for C4I/support equipment to meet/exceed identified exposure levels to ensure critical operational effectiveness; continue environmental modeling and simulation tool improvements; assist in coordinating technology infusion to support pre-planned product improvements; continue support to TMD program offices in refining software development practices and mitigating technical, cost, and schedule risks across BMD/TMD software development, integration, testing, and maintenance efforts.
- \$300 - \$466	Support for BMDO services (e.g., security, contracting, supplies). Support for Blue Team Analysis to study counter-countermeasures to TMD system.
Project 3160	Page 61 of 120 Pages Exhibit R-2 (PE 0603872C)

DATE February 1997	j		ns including: review of products alyses and trade-off studies; risk I BM/C3 efforts; conduct echnical and programmatic res including: system concept ses; reviews of mandated tion; modeling, simulation, and analyses of critical issues. integration interfaces; prepare TMD Integrated Test Plan; slopment. I threshold/objective hardness posure levels to ensure critical ating technology infusion to lopment practices and mitigating e efforts.	Exhibit R-2 (PE 0603872C)
	PENUMBER AN SET THEATER MISSILE DEFENSE	nbat Developments Directorate-Ft Bliss, TX. ersonnel management. support to Program Executive Officer, Missile Defense, Huntsville, AL.	JS BMD test ranges. Ind technical support for the acquisition, integration, and fielding of TMD syster fications, and requirements; modeling and simulation support of architecture an ining support; engineering and technical support for international programs and the programmatic documentation. ADTEN distributed analyses and operations; development and maintenance of thical reports, briefings, and programmatic documentation. Independent technical and engineering assessments of TMD system architectutical element technical and programmatic assessments including trade-off analy, tive programs, and treaty implications; multi-Service and allied BM/C3 integration tical element technical and programmatic assessments including trade-off analy, tive programs, and treaty implications; multi-Service and allied BM/C3 integration of fielded components into operational units; and specific studies; tintegration of fielded components into operationally-directed studies. IMD JEA, individual system JEAs, and congressionally-directed studies. integration support at the TMD system level. Continue to identify inter-Service by changes required in theater air defense C3I systems to support TBMD; update tents; and plan, coordinate, and nanalyze C2 wargames; determine adequacy of uipment; identify SEOs for C4Usupport equipment to meet/exceed identified exceeding, interoperability, and resolution of interface issues; determine assist in coordin rovements; continue support to TMD program offices in refining software deve s across BMD/TMD software development, integration, testing, and maintenance, security, contracting, supplies). To study counter-countermeasures to TMD system. ersonnel management. support to Program Executive Officer, Missile Defense, Huntsville, AL.	
RDT&E BUDGET ITEM JUNIFICATION SHEET (R-2 Exhibit)		Provide technical support to Combat Developments Directorate-Ft Bliss, TX Support BMDO operations and personnel management. Provided personnel management support to Program Executive Officer, Mis Total	nue utilization of TOTS at I de scientific, engineering, a mparison to standards, specition and acquisition streamluded Air Defense Testbed (Fases; and preparation of tecl system and assessment; criment and assessment; criments, international cooperational support to the Tase system engineering and the system description docum de support to Service integrational of CAI support equinonal effectiveness; continuat pre-planned product impical, cost, and schedule risk out for BMDO services (e.g. out BMDO operations and p ded personnel management	Page 62 of 120 Pages
RDT	BUDGET ACTIVITY 4 - Demonstration and Validation	- \$1,999 - \$5,458 - \$221 - \$50,909	EY 1998 (\$ in Thousand\$): - \$1,134 Conti - \$13,915 Provi in con reduce Exter datab - \$14,030 Using devel docun exper - \$3,986 Provi - \$19,038 Incre engin updat - \$5,575 Provi speci opera - \$409 Suppe - \$5,817 Supp - \$5,817 Supp - \$5,817 Supp - \$5,817 Supp - \$5,817 Supp - \$5,817 Supp	Project 3160



RDT&E BUDGET ITEM JU	USTIFICATION SHEET (R-2 Exhibit)	N SHE	ET (R-2 E)	xhibit)		DATE	February 1997	y 1997	
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMB 06038	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	rheater Mi	issile De	fense		РRОЈЕСТ 3160	ест)
 EY 1999 (\$ in Thousands): \$11,13 Continue utilization of TOTS at US BMD test ranges. \$14,263 Provide Scientific, Engineering and Technical Assistance (SETA) support of TMD systems acquisition. \$14,250 Using FFRDC resources, perform independent and technical engineering assessment and studies to support fielding TMD systems. \$2,257 Provide technical support to congressional directed studies (e.g. JEA). \$5,314 Inter-Service Integration Efforts. \$15,314 Technical Support for BMDO services. \$15,314 Technical Support Study counter-countermeasures to TMD systems. \$15,314 Support Blue Team analysis to study counter-countermeasures to TMD systems. \$17,234 Support BMDO operations and engineering, and TMD system survivability. \$17,234 Support BMDO operations and personnel management. \$5,970 Provided personnel management support to Program Executive Officer, Missile Defense, Huntsville, AL. \$62,031 Total 	US BMD test ranges. and Technical Assistance (SETA) support of TMD systems acquisition. n independent and technical engineering assessment and studies to suppogressional directed studies (e.g. JEA). ravices. tudy counter-countermeasures to TMD systems. nd engineering, and TMD system survivability. personnel management. t support to Program Executive Officer, Missile Defense, Huntsville, AL.	nce (SETA) thical enginaties (e.g. Jl neasures to 'MD system tt. Executive O	support of TMI recring assessm:A). IMD systems. survivability.	Systems acq ent and studie	uisition. s to support	fielding TM	D systems.	_	
Acquisition Strategy: This project uses a combination of I United Kingdom Ministry of Defense.	of FFRDC, competitively awarded SETA contracts, and a Memorandum of Understanding (MOU) with the	ively awarde	d SETA contra	cts, and a Mer	morandum o	of Understan	Jing (MOU	J) with th	0
B. Program Change Summary (\$ in Thousands)									
Previous President's Budget Current Budget Submit/President's Budget	FX 1996 47,919 45,358	FY 1997 55,669 50,909	7 EY 1998 69 67,892 99 65,260	H	FY 1999 60,858 62,031	Total Cost 232,338 223,558			
Change Summary Explanation: Funding: Funding transferred to higher priority projects. Schedule: None Technical: None	cts.								
C. Other Program Funding Summary (\$ in Thousands)									
FY 1996	FY 1997	FY 1998 F	FY 1999 FY 2000	:000 FY 2001	01 EY 2002	002 FY 2003		To Compl	Total Cost
Project 3160	Pag	Page 63 of 120 Pages	Pages		Ш	Exhibit R-2 (PE 0603872C)	E 060387	72C)	

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BUDGET ACTIVITY 4 - Demonstration and Validation			Ы	PE NUMBER AND TITLE 0603872C Joint	Joint 1	heate	TITLE Joint Theater Missile Defense	Defense			РКОЈЕСТ 3160
D. Schedule Profile											
_	FY 1996	4	-	FY 1997	4	-	FY 1998	~		FY 1999	-
Engineering Milestone	1	r	-		t	-		r	-		4
T&E Milestone											
Tech Demo Milestone											
Contract Milestone		;			;			;			
- Deliver LIMD Sys KD		× ;			× ;			× ;			×
- Deliver TMD Int Test Dlan		< >			< >			× >			×
- Deliver TMD C31 Int Assessment		< ×			< ×			< ×			< ×
- Deliver TMD Surv Assessment		×			×			: ×			: ×
- TMD BMC3 WG Plan/Exec	×	×		×	×		×	×		×	: ×
- TIBS/TRAP Msg Int		×			×			×			×
BMDO EADTB Node Development											
- Node IOC		×									
- Full distributed Operations				×			×		×	~	
Support through delivery of integration											
engineering analysis the following TMD											
events:	;										
- Navy Area TBMD Det COEA comp	×	>									
- Navy Area 1 bivil Defense MS II		<	;		;						
- I HAAD Flight lest			< >	×	×						
TAIN CDD Toront Total		•	<								
PAC 1 CDD Target Tests				< < >							
DBI DD				< >							
C21 Integration Test				>			>			>	
Custom Integration Test				<	>		<	>		<	>
THAAD MS II					<		×	<			<
- PAC-3 LRIP Decision							(×			
- BPI KKV CDR							×	<u> </u>			
Project 3160			Dage 64	Page 64 of 120 Pages	p.			Evhihit D	Evhihit P.3 (PE 0603873C	(762860)	

RDT&E BUDGET ITEM JU	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	PROJECT 3160
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Project 3160	Page 65 of 120 Pages	Exhibit R-2 (PE 0603872C)

8	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	3RAM EL	EMENT/F	ROJECT	COSTE	REAKD	OWN (R-	3)	DATE F	February 1997	76
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Va	lidation			PE NUMBE 060387	PE NUMBER AND TITLE 0603872C Joint	Theater M	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	l	8	PROJECT 3160
A. Project Cost Breakdown (\$ in Thousands)	reakdown (S in	Thousands)									
				FY 1996		FY 1997	FY 1998	FX 1999	 .		<u></u>
Developmental Test & Evaluation Program Management Support Systems Engineering Program Management Personnel Total	st & Evaluation tent Support ng ent Personnel			2,470 29,134 10,529 3,225 45,358		1,107 25,821 16,303 7,678 50,909	1,134 33,340 24,613 6,173 65,260	1,113 32,035 22,548 6,335 62,031	no 10 en :-		
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ition History an	d Planning In	formation (S.i	n.Thousands)							
Performing Organizations:	nizations:										
Contractor or Government Performing	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	ent Organizations	ø.									
Support and Management Organizations SETA CPAF No	gement Organizat CPAF	tions Nov 96				9,775	8,953	13,915	14,263	ONGOING	46,906
Other Supt. Cont.	MIPR	Multiple Multiple				28,094 5,019	28,563 12,286	38,463 11,748	35,006 11,649	ONGOING	130,126 40,702
Test and Evaluation Organizations DT&E	n Organizations					2,470	1,107	1,134	1,113	ONGOING	5,824
Project 3160				Page	Page 66 of 120 Pages	ages		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&E PR	RDT&E PROGRAM ELEME	EMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3		DATE Fe	February 1997	197
BUDGET ACTIVITY 4 - Demonstration and Validation	Validation		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	D TITLE Joint Theater Missile Defense	ssile Defe		T 63	РРОЈЕСТ 3160
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	and Planning In	formation Continued (\$ in T	nousands)						
Government Furnished Property:	rty:								
Contract Method/Type Item or Funding Description Vehicle	ype Award or g Obligation <u>Date</u>	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total
Product Development Property									
Support and Management Property	ζŢ								
Test and Evaluation Property									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	nt			42,888 2,470	49,802	64,126 1,134	60,918		217,734
Total Project				45,358	50,909	65,260	62,031		223,558
Project 3160		Page	Page 67 of 120 Pages	res		Exhil	Exhibit R-3 (PE 0603872C)	0603872C)	
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RDT&E BUDGET ITEM		TIFICA	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Feb	February 1997	197
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	rirce I oint The a	PE NUMBER AND TITLE O603872C Joint Theater Missile Defense	ile Defen	Se	6	PROJECT 3251
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3261 TMD BM/C3I (BM/C3I Concepts)	0	32,357	34,094	35,864	43,717	44,576	43,210		Continuing	43,286 Continuing Continuing

A. Mission Description and Budget Item Justification

Control, Communications, and Intelligence (BM/C31) capability having the flexibility to meet a wide range of threats and expected needs. The BM/C31 architecture for sensors, interceptors, and C2 nodes and to synergize their individual contributions to an integrated Joint theater-wide TMD system. BMDO has three major thrusts to TMD is built upon the existing command and control (C2) structure for Theater Air Defense (TAD) and adds the communications linking TMD C2 nodes, weapons, The primary mission of this project is to provide the warfighter with an integrated and interoperable Theater Missile Defense (TMD) Battle Management/Command, independent weapon systems development and to provide guidance, standards, equipment, integration, and analysis to maximize the performance of a multitude of and sensors, and the TMD interfaces to intelligence systems and other supporting capabilities. The BMDO, from its joint perspective, uses this project to oversee the TMD BM/C3I integration program.

intelligence systems external to TMD. This project supports the system engineering of their capability and prototype development of items such as improved displays The first thrust establishes the links and means for receipt of and in-theater dissemination of early warning and launch warning information from space-based and for early in-theater warning information. This project focuses on linking separate external systems into the theater.

Distribution System (JTIDS) and the Tactical Data Information Link-JTIDS (TADIL-J) message format. This project integrates JTIDS terminals into existing Theater communications equipment, and protocols as well as the common command and control procedures among different weapons systems to ensure a truly integrated Ballistic Missile Defense (TBMD) C2 platforms and provides the necessary software upgrades. This funding is critical for timely inter-Service interoperability. theater-wide ballistic missile defense system. The cornerstone of TMD interoperability is the Joint Data Net (JDN) which uses the Joint Tactical Information The second thrust of the BM/C31 program focuses on communication and interoperability among TMD weapon systems. Interoperability includes both the

The third thrust of the BM/C31 program directs attention to upgrades of Service C2 centers. Various command center upgrades are included in this project to reduce decision-moling time necessary to effectively engage ballistic missiles. Again, BMDO leverages off several existing Service-funded theater air defense command center upgrades and this project funds only the specific TMD-related aspects of these upgrades. BMDO's central direction and support of hardware and software developments will produce an integrated C2 capability for TMD.

The joint warfighters and BM/C3I developers evaluate the effects of early warning, improved interoperability, integration, and command center upgrades on joint TBMD doctrine through BM/C3I work shops and analysis.

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Exhibit R-2 (PE 0603872C)



RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)
BUDGET ACTIVITY 4 - Demonstration and Valida	PROJECT Of The And Valida 3251 3251
All of the efforts in the times and allow more other friendly forces.	All of the efforts in this project are designed to provide a seamless interoperable architecture to provide timely warning and information necessary to reduce decision times and allow more opportunities to efficiently and effectively engage hostile missiles. The end result will kill more missiles and will reduce casualties to U.S. and other friendly forces.
FY 1996 (\$ in Thousands): - \$0 There - \$0 Total	sands): There is no funding under this project in this PE for FY96. This project was transferred from PE 0603864 per Congressional Direction. Total
FY 1997 (\$ in Thousands): - \$5,390 BM//	sands): BM/C3I Integration - Army: Integrate JTIDS into Army systems; develop terminal initialization parameters; demonstrate enclave interoperability; integrate User Operational Evaluation System (UOES) upper/lower tier; continue TMD Cell/TOC automation.
- \$14,515 - \$5,400	BM/C31 Integration - Air Force: Continue JTIDS integration efforts, initiate integration into two additional existing platforms; Air Operations Center/Command Reporting Center (AOC/CRC) upgrades for TMD; begin development of JTIDS Range Extension (JRE) capability. BM/C31 Integration - USMC: Complete development of AN/TPS-59 cue acceptance software; commence development of TAOM BM/C31
- \$283 - \$4,394	BM/C31 Integration - Navy: Support joint development of JTIDS Range Extension (JRE). BM/C31 Integration - Navy: Support joint development of JTIDS Range Extension (JRE). BM/C31 Integration - Joint/Combined: Obtain/approve additional TADIL-J TMD messages; transition MIDS development to the Army; conduct evaluations of JTIDS networks to determine value of JTIDS Time Slot Reallocation (TSR); begin software integration of TMD messages; obtain NATO approval of additional TADIL-J messages; perform an integrated engineering analysis for the joint composite tracking network (JCTN)
- \$2,375 - \$32,357	including the cooperative engagement capability. BM/C31 Integration - Joint National Test Facility (NTF): Conduct TMD BMC31 work shop; conduct C2 tests to refine C2 procedures; deploy joint TMD planning capability to command centers for initial user testing. Total
EY 1998 (\$ in Thousands): - \$9,995 BM/v effort - \$12,654 BM/v addit	 Sands): BM/C31 Integration - Army: Field two Tactical Operations Centers (TOC) to active Army brigades; support JTIDS Range Extension (JRE) efforts; participate in JTIDS network management activities; initiate Joint TMD Planner (JTMDP) integration into Army host platforms. BM/C31 Integration - Air Force: Develop an automated intelligence database function; continue JTIDS platform integration; initiate one additional platform; continue JRE development; technology development of distributed battle management; and validate TMD battlefield
- \$291 - \$2,500 - \$6,098	situation display software. BM/C31 Integration - Navy: Continue support of joint development of JRE. BM/C31 Integration - USMC: Complete testing of AN/TPS-59 cue capability; and continue TAOM BMC31 software development. BM/C31 Integration - Joint/Combined: Update TADIL-J message set approval and initiate definition and development of joint composite tracking network (JCTN).
Project 3251	Page 69 of 120 Pages Exhibit R-2 (PE 0603872C)

RDT&E	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET (R	-2 Exhibit		DATE February 1997	7
ration	alidation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ודוב oint Theate	r Missile De	rense 32	PROJECT 3251
- \$2,556 BM/C31 Global (- \$34,094 Total	BM/C31 Integration - JNTF: Continue BMC31 work shops; update Joint TMD Planner (JTMDP) based on initial user test results; and provide Global Command and Control System (GCCS) capability for TMD applications evaluations. Total	hops; update Joint Tr ility for TMD applica	AD Planner (JTI tions evaluation	MDP) based on 1 s.	nitial user test results; and pro	vide
EY 1999 (\$ in Thousands): - \$7,916 BM/C31 - \$11,701 BM/C31 Battlesp - \$290 BM/C31	BM/C3I Integration - Army: Continue integration of THAAD EMD and Navy TMD systems into brigade TOC planner; continue JRE support. BM/C3I Integration - Air Force: Start JTIDS TMD integration to AOC; continue installation on AWACS, test integration on Airborne Battlefield Command and Control Center (ABCCC); perform TMD BSD SW modification to AOC; upgrade Intelligence Preparation of the Battlespace (IPB) GCCS decision support tool; continue JRE development. BM/C31 Integration - Navy: Continue support of IRP	THAAD EMD and N tegration to AOC; cc perform TMD BSD S tue JRE development	lavy TMD syste ontinue installati W modification	ms into brigade on on AWACS, to AOC; upgrad	ntinue integration of THAAD EMD and Navy TMD systems into brigade TOC planner; continue JRE su Start JTIDS TMD integration to AOC; continue installation on AWACS, test integration on Airborne of Center (ABCCC); perform TMD BSD SW modification to AOC; upgrade Intelligence Preparation of the support tool; continue JRE development.	pport. he
66 1 64	BM/C31 Integration - Joint: Continue 3 of post of the Samuel and update TMD TADIL message sets. BM/C31 Integration - Joint: Continue BM/C31 work shops; perform user assessments of TMD GCCS TMD applications; and identify product improvements to the JTMDP. Total	rent and update TML shops; perform user	TADIL messag assessments of T	je sets. IMD GCCS TMI	D applications; and identify pr	oduct
Acquisition Strategy: The 32 accomplishes supporting task: managed service programs so	Acquisition Strategy: The 3261 Project acquisition strategy leverages existing system acquisition programs (which are subject to milestone decisions and testing) and accomplishes supporting tasks to satisfy BM/C31 performance requirements. A significant portion of this project entails systems engineering of separately funded and managed service programs so that all systems will interoperate when fielded.	ing system acquisitio s. A significant porti 1.	n programs (whi on of this projec	ch are subject to t entails systems	milestone decisions and testir engineering of separately func	ig) and led and
B. Program Change Summary (\$ in Thousands)	S in Thousands)					****
Previous President's Budget Current Budget Submit/President's Budget	FY 1996 0 8 Budget 0	FY 1997 31,388 32,357	FY 1998 36,562 34,094	FY 1999 39,018 35,864	Total <u>Cost</u> 106,968 102,315	
Change Summary Explanation: Funding: Congressional di program element. Consiste supporting the Navy Area (Project 2263) to unify con addressed in an integrated those for COBRA JUDY a Schedule: None	Summary Explanation: Funding: Congressional direction eliminated the TMD BM/C3I program elements 0603864/0604864C and placed this project under the Joint TMD activities program element. Consistent with this direction, a determination was made that this program is more appropriately funded with Dem/Val funds. Navy tasks directly supporting the Navy Area TBMD program were deleted from this project for FY1997 and beyond, and funded under the Navy Area TBMD program element (Project 2263) to unify control. Additional FY1997 funds were authorized and appropriated for cooperative engagement capability (CEC) integration. This will be addressed in an integrated engineering analysis for the joint composite tracking network. In FY1997, Project 3261 was cut to pay various PBD reductions including those for COBRA JUDY and MEADS. In FY1997-2003, Project 3261 was cut as part of a reallocation of BMDO funds to support the JNTF.	n elements 0603864/0 ade that this program ct for FY1997 and be zed and appropriated racking network. In was cut as part of a re	604864C and plis more approprisond, and funde for cooperative. FY1997, Project allocation of Bl	aced this project iately funded wi id under the Nav engagement caps 3261 was cut to	t under the Joint TMD activitie th Dem/Val funds. Navy tasks y Area TBMD program eleme ability (CEC) integration. This pay various PBD reductions i pport the JNTF.	s directly nt s will be ncluding
Project 3251	Pag	Page 70 of 120 Pages		Ê	Exhibit R-2 (PE 0603872C)	

Per Number And The State Per Number And The Per	RDT&E BUDGET ITEM JUSTII	USTIFICATION SHEET (R-2 Exhibit) PATE Feb	February 1997
rer programs, it supports other programs by providing capstone systems engineering, common BM/C3I guida etwork design analysis, and other actions necessary to achieve interoperability among independent systems. To To To To To To To To To To To To To T	BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	РRОЈЕСТ 3251
the programs, it supports other programs by providing capstone systems engineering, common BM/C31 guida etwork design analysis, and other actions necessary to achieve interoperability among independent systems. To To To To To To To To To To To To To T	Technical: None		
the program is not dependent upon funding from other programs, it supports other programs by providing capstone systems engineering, common BMC31 guida runnent furnished equipment, interface support, joint network design analysis, and other actions necessary to achieve interoperability among independent systems. EX 1996	C. Other Program Funding Summary (\$ in Thousands)		
thedule Profile EY 1996 FY 1997 FY 1998 FY 1999 FY 2000 FY 2001 FY 2002 FY 2003 Compl EY 1996 FY 1997 FY 1999 FY 2000 FY 2001 FY 2003 Compl In handbook published (Army) Software library & re-use database sinstead (Army) Software library & re-use database sinstead (Army) A	While this program is not dependent upon funding from other progragovernment furnished equipment, interface support, joint network de	ams, it supports other programs by providing capstone systems engineering, commesign analysis, and other actions necessary to achieve interoperability among indep	non BM/C3I guidance, pendent systems.
FY 1996	9661	FY 1998 FY 1999 FY 2000 FY 2001 FY 2002	To Total Compl Cost
FX 1996 FY 1997 FY 1998 FY 1999 FY 1999 FY 1999	D. Schodule Profile		
1	EX	X 1997 FY 1998	
link handbook published (Army) Y Is software library & re-use database lished (Army) X Ished (Army) X Ished (Army) X Ished (Army) CS TMD message implementation Ge TOC fielding (Army) The three additional AF platform TMD age set implementations (AF) TMD Planner prototype for initial Battlefield Situation display (AF) plete AF platform TMD message set mentations (AF) TRD Planner prototype for unitial Battlefield Situation display (AF) plete AF platform TMD message set mentations (AF) TRD Planner prototype for unitial Setting Particular (AF) Proceed additional AF) Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner platform TMD message set mentations (AF) Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF) TMD planner platform TMD message set mentations (AF) TMD planner prototype for initial Supplete AF platform TMD message set mentations (AF)	1 2	1 2 3 4 1 2 3 4 1	٠,
Ished (Army) Ger TOC fielding (Army) te three additional AF platform TMD ges ti implementations (AF) Sesting Battlefield Situation display (AF) plete AF platform TMD message set mentations (AF) Testing Battlefield Situation display (AF) plete AF platform TMD message set mentations (AF) The Secondary of the secondary	Engineering Millestone Data link handbook published (Army) The continues library & resuse detabase	× ×	
control of the contro	established (Army)	. ×	
ACS TMD message implementation de TOC fielding (Army) te three additional AF platform TMD age set implementations (AF) TMD Planner prototype for initial testing Battlefield Situation display (AF) plete AF platform TMD message set smentations (AF) TRAD Planner prototype for initial testing TRAD Planner prototype for initial TRAD Planner prot	I wo CIC/SAA Wr prototypes demonstrated (USAF/USMC)		
te three additional AF platform TMD age set implementations (AF) TMD Planner prototype for initial TMD Planner prototype for initial testing Battlefield Situation display (AF) plete AF platform TMD message set ementations (AF) PS-59 cue capability (USMC) vare modifications to AOC during S update	AWACS TMD message implementation	×	
et Dans 71 of 130 Pages	(Ar.) Brigade TOC fielding (Army) Initiate three additional AF plafform TMD	×	
et Dana 71 of 130 Danas	message set implementations (AF)	×	
et Dana 71 of 130 Danas	user testing	>	
Dara 11 of 130 Daras	TMD Battlefield Situation display (AF) Complete AF platform TMD message set	< ×	
ing	implementations (AF) AN/TPS-59 cue capability (USMC)		;
Dans 71 of 170 Pages	Software modifications to AOC during GCCS update		×
1 uke / 1 0/ 120 1 uke	Project 3251	Page 71 of 120 Pages Exhibit R-2 (PE 0	0603872C)

RDT&E BUDGET ITEM JUSTIFICATION	USTIFICATION SHEET (R-2 Exhibit)	hibit)	DATE February 1997	266
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Th	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense		PROJECT 3251
EX 1996 1 2 3 4 ABCCC TMD integration on C-130 test platform Fielding of USMC TAOM TMD upgrades	FY 1997 2 3 4	1 2 3 4	EY 1999 1 2 3 X	4 X
Project 3251	Page 72 of 120 Pages	Exhib	Exhibit R-2 (PE 0603872C)	
NO	204			
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RD.	RDT&E PROGRAM ELEME	SRAM EL	EMENT/F	ROJE	ST CO	ST BI	ZEAKD(NT/PROJECT COST BREAKDOWN (R-3)	3)	DATE F e	February 1997	997
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation			E 0	. NUMBER 603872	PE NUMBER AND TITLE 0603872C Joint	Theater M	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense)nse		РРОЈЕСТ 3251
A. Project Cost Breakdown (\$ in Thousands)	eakdown (\$ in	Thousands)										
				EX	FY 1996	EX	EY 1997	FY 1998	FY 1999			
a. Hardware Developmentb. Software Developmentc. Project Managementd. System EngineeringTotal	opment pment nent ing				0000	. 5 19 7 32	5,677 19,258 300 7,122 32,357	10,460 13,837 307 9,490 34,094	17,322 10,274 318 7,950 35,864	a)		
B. Budget Acquisition History and Planning Information (\$\sqrt{s}\$ in Thousands) Performing Organizations:	tion History an izations:	d Planning In	formation (\$ 1	n Thousanc	(S)							
Contractor or Government Performing Activity	Contract Method/Type or Funding <u>Vehicle</u>	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Pr FY	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations OGA MIPRs/Allot	ent Organizations MIPRs/Allot	s Multiple						32,357	34,094	35,864	Cont	Cont
Support and Management Organizations	ement Organizai	tions										
Test and Evaluation Organizations	Organizations											
Project 3251					Page 73	Page 73 of 120 Pages	səs		Exh	ibit R-3 (PE	Exhibit R-3 (PE 0603872C)	

RDT&E BUDGET ITEM		TIFICA	TION SI	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	TITLE oint The	ater Miss	PENUMBER AND TITLE 0603872C Joint Theater Missile Defense	l	E C	PROJECT 3261
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3265 User Interface	15,286	14,031	14,680	21,976	22,060	22,113	22,048	22,118	22,118 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

development reflects evolving military needs and the combined warfare capabilities of allies and friends. To accomplish this, there must be clearly articulated tactics, doctrine, policies, and procedures. The three areas which provide the information base to effectively transition TMD capabilities into the existing and planned This project provides the Joint Staff and the warfighting Commanders-in-Chief (CINCs) with the means to ensure that the Theater Missile Defense (TMD) operational activities and war plans are described below.

High Altitude Area Defense (THAAD), and Navy Area Theater Ballistic Missile Defense (TBMD) into the theater's warfighting capability. In future years, the CINCs' Program, which involves the execution of numerous operationally realistic military exercises. These exercises provide the basis for the assessment, development, and TMD Assessment Program will continue to develop ways to improve the CINCs' warfighting capabilities and integrate emerging TMD capabilities through simulation and employment of UOES hardware. Within the context of Combined Warfare, the Assessments Program focuses on providing the means for the U.S. and its allies to Operational Evaluation Systems (UOES) to examine the effectiveness of architectures and operational concepts. UOES is a prototype operational system of hardware exercises communications architectures and develops operational concepts that will enable rapid integration of the PATRIOT Advanced Capability (PAC-3), Theater improvement of TMD capabilities. Specific activities include the integration of new technology and hardware into the CINC operations, and the integration of User The project's primary area is focused on the refinement of existing and near-term TMD capabilities. This is accomplished through the CINC's TMD Assessments and procedures which will be user-operated for field evaluation purposes. Through the Assessments Program, the CINCs develop Battle Management Command, Control, and Communications (BM/C3) architectures, formulate and test operational concepts, and determine or refine operational requirements. This program develop an understanding of each other's doctrine and common concepts of operation, and to determine equipment compatibility and interoperability

performed to educate the TMD development community concerning the challenges presented by the theater missile threat. The WALEX provide forums for discussion The second area focuses on understanding the changing threat and how to best counter that threat. This is accomplished through the conduct of Warfare Analysis Laboratory Exercises (WALEX). Relying primarily on computer simulation tools and real experiences from the CINC's Assessment program, these exercises are of complex issues associated with concepts of operation for existing and future capabilities.

systems and architectures to (a) deploy theater missile defense capability to protect forward-deployed armed forces of the U.S., friends, and allies, and, (b) demonstrate advanced technologies for near-term insertion options and concept development of new systems. Analyses and simulations address systems effectiveness of proposed The third area focuses on the integration of warfighter operational requirements with near and far term Ballistic Missile Defense (BMD) program development. TMD experiences gleaned from such programs as the CINC's Assessment program are factored into all TMD programs. These programs are to develop and acquire TMD programs (e.g. THAAD, Navy TBMD, etc.) are in various stages of development, and are scheduled for future deployment. This project area ensures that the

roject 3261

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Exhibit R-2 (PE 0603872C)



8	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) February 1997
BUDGET ACTIVITY 4 - Demonstration	BUDGET ACTIVITY 4 - Demonstration and Validation PROJECT Demonstration and Validation PROJECT PROJEC
TMD system arch for the Defense ac	TMD system architectures against ballistic missile threats to U.S. deployed forces, our allies and friends. Analytical results are also used to support activities required for the Defense acquisition process. Theater gaming with the CINCs is also supported to identify roles, missions, and requirements for TMD.
FY 1996 (\$ in Thousands): - \$3,000 Supp - \$3,000 Supp - \$2,900 Supp	Supported USEUCOM Joint Project Optic Needle. Supported USCENTCOM Joint Project Optic Cobra. Supported USFK Joint Project Ornate Impact.
- \$1,654 - \$1,628 - \$318 - \$325	Supported USACOM TMD Exercises. Supported USPACOM TMD Exercises. Integrated improved TMD model supporting Command Post Exercises and allies/friends. Reviewed Operational Requirement Documents.
- \$500 - \$268 - \$293 - \$400 - \$1,000	Developed operational concept(s) of operations for BMD. Conducted theater and strategic wargaming, including GLOBAL 96. Conducted mission analysis for BMD (including allies/friends). Conducted mission analysis Laboratory Exercises. Integrated capability to display simulated TBMs on PATRIOT Engagement Control System radar scopes supporting Field Training Exercises. Total
FY 1997 (\$ in Thousands): - \$3,000 Supp - \$3,250 Supp - \$2,440 Supp - \$613 Supp - \$613 Supp - \$400 Revie - \$139 Cond - \$250 Cond - \$739 Cond - \$739 Cond	Support USEUCOM Joint Project Optic Needle. Support USCENTCOM Joint Project Optic Cobra. Support USCENTCOM Joint Project Ornate Impact. Support USFK Joint Project Ornate Impact. Support USACOM TMD Exercises. Support USPACOM TMD Exercises. Review ORDs. Conduct theater and strategic wargaming, including GLOBAL 97. Conduct mission analysis for TMD (including allies/friends). Conduct five Warfare Analysis Laboratory Exercises. Total
FY 1998 (\$ in Thousands): - \$3,000 Supp - \$3,000 Supp - \$2,750 Supp	Support USEUCOM Joint Project Optic Needle. Support USENTCOM Joint Project Optic Cobra. Support USFK Joint Project Ornate Impact. Page 75 of 120 Pages Exhibit R-2 (PE 0603872C)

RD	RDT&E BUDGET ITEM JUSTIFICATIOI	USTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	PROJECT 3261
- \$2,000 - \$1,900 - \$576 - \$100 - \$94 - \$485 - \$775	Support USACOM TMD Exercises. Support USPACOM TMD Exercises. Support USPACOM TMD Exercises. Integrate capability to display simulated TBMs on developing operator radar scopes supporting Field Training Exercises. Review ORDs/CRD Conduct theater and strategic wargaming, including GLOBAL 98. Conduct mission analysis for TMD (including allies/friends) Conduct five Warfare Analysis Laboratory Exercises. Total	loping operator radar scopes supporting Field Train OBAL 98. nds)	ing Exercises.
EY 1999 (\$ in Thousands): - \$4,900 Support - \$4,000 Support - \$3,800 Support - \$3,800 Support - \$3,500 Support - \$2,92 Integral - \$100 Review - \$93 Condu - \$807 Condu - \$807 - \$21,976 Total Acquisition Strategy: Mana assessments. Each theater or updated throughout the year.	tt USEUCOM Joint Project tt USENTCOM Joint Project tt USFK Joint Project Omai tt USFK Joint Project Omai tt USFACOM TMD Exercise tt USACOM TMD Exercise tt USPACOM TMD Exercise tt USPACOM TMD Exercise tt USPACOM TMD Exercise tt USPACOM TMD Exercise tt USFACOM TMD Exercis	optic Needle. lect Optic Cobra. let Impact. ss. gaming, including GLOBAL 99. D (including allies/friends). soratory Exercises. the use of weekly task plans, monthly progress and expenditure reports, quarterly reviews, and semi-annual Reviews to monitor and manage the preparation for scheduled activities. ORDs/CRD and CONOPs are	ing Exercises. quarterly reviews, and semi-annual ORDs/CRD and CONOPs are
Project 3261	Page	Page 76 of 120 Pages E:	Exhibit R-2 (PE 0603872C)



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ION SHI	EET (R	2 Exhit	oit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUN 0603	PE NUMBER AND TITLE 0603872C Joint	गट oint Thea	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	le Defen	es	# K	PROJECT 3261
B. Program Change Summary (\$ in Thousands)								
Previous President's Budget 15,293 Current Budget Submit/President's Budget 15,286	띰	<u>Y 1997</u> 13,869 14,031	EY 1998 15,128 14,680	FY 1999 22,725 21,976		Total Cost 67,015 65,973		
Change Summary Explanation: Funding: Additional funds received in FY97 for Roving Sands support	ort							
Schedule: None								
Technical: None								
C. Other Program Funding Summary (\$ in Thousands)								
FY 1996 FY 1997	<u>FY 1998</u>	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	To Compl Cont.	Total Cost Cont.
D. Schedule Profile								
EV 1996 2 3	FY 1	FY 1997 2 3	4	X 199		1 2 E	X 199	4
×		××	×	×	× ×		××	×
Refine ORD/CONOPS X X X X	×	< ×	×	×	×	×		×
Project 3261	Page 77 of 120 Pages	0 Pages			Exhib	Exhibit R-2 (PE 0603872C)	03872C)	

RD.	RDT&E PROGRAM ELEME	3RAM EL		NT/PROJECT COST BREAKDOWN (R-3)	COSTE	REAKD(OWN (R-	3)	DATE Fe	February 1997	26
BUDGET ACTIVITY 4 - Demonstration and Validation	ntion and Va	lidation			PE NUMBE 060387	PE NUMBER AND TITLE 0603872C Joint	Theater M	DE NUMBER AND TITLE OG03872C Joint Theater Missile Defense	nse	ູຕ	PROJECT 3261
A. Project Cost Breakdown (\$ in Thousands)	reakdown (S in	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999			
CINC Exercise Assessment Support Allied interface, wargaming, WALEX, Rqmts Document Spt Total	essment Support rgaming, WALE	t 3X, Rqmts Doc	ument Spt	14,240 1,046 15,286		12,501 1,530 14,031	13,226 1,454 14,680	20,205 1,771 21,976			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	tion History an	d Planning Inf	formation (\$ 1)	n Thousands)							
Performing Organizations:	iizations:										· · · · · · · · · · · · · · · · · · ·
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	ent Organizations	wa .									
Support and Management Organizations CINCs MIPRs Mu	cement Organizat MIPRs	tions Multiple				15286	14031	14680	21976	Cont	65,973
Test and Evaluation Organizations	1 Organizations			•							
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	ition History an	d Planning In	formation Co	ntinued (S in T	iousands)						
Government Furnished Property:	ished Property:										
Project 3261				Pag	Page 78 of 120 Pages	ages		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	
						6					



RDT&E PROGRAM ELEME	IM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BR	EAKDO	WN (R-3		DATE Fe	February 1997	26
BUDGET ACTIVITY 4 - Demonstration and Validation	lion	PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	heater Mi	ס זודוב Joint Theater Missile Defense	ense	9 8	РРОЈЕСТ 3261
Contract Method/Type Awan Item or Funding Oblig Description Vehicle Date	Award or Obligation Delivery <u>Date</u> Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property								
Support and Management Property								¥.
Test and Evaluation Property								
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation			15,286	14,031	14,680	21,976		65,973
Total Project	•		15,286	14,031	14,680	21,976		65,973
Project 3261	Pag	Page 79 of 120 Pages	es		Exhi	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&E BUDGET ITEM		TIFICA.	TION SE	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fet	February 1997	197
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint	TITLE oint The	ater Miss	PENUMBER AND TITLE 0603872C Joint Theater Missile Defense]	. 6	PROJECT 3265
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3270 Threat and Countermeasures Program	19,865	21,419	27,986	29,154	27,981	27,891	28,779	27,898	27,898 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

traceable to quantifiable analysis. This project produces capstone threat and countermeasure documentation to ensure consistent technical threat definitions across all Ballistic Missile (TBM) threats. To accomplish this mission, BMDO has a threat development program which is based on intelligence community projections and is the Services. It does not duplicate Service-unique activities. The program consists of three component tasks: Intelligence Threat, Countermeasures Integration, and Threat and Countermeasuries Program. The BMDO Theater Missile Defense (TMD) Threat Program defines potential adversary military forces, principally Theater System Threat Scenario Generation.

characteristics, and sample signatures. SST addresses threats to the TMD "family of systems" including reconnaissance, surveillance, and target acquisition; lethal and non-lethal threats; and regional integrated SST assessments. The Reactive Threats category includes those that an adversary may develop as a result of deployment of Intelligence Threat Task. The purpose of this task is to provide an Intelligence Community-Validated TMD threat description. The threat is divided into four major includes assessments of the TBM operational and technological environments and projects the effects of developments and trends on TMD mission capability. The categories under this task: Operational Threat Environment, Targets, System Specific Threats (SST), and Reactive Threats. The Operational Threat Environment Targets category includes a projection of foreign TBM systems and countermeasures that enhance their performance. This includes force structure, performance the TMD "family of systems."

applications, and the operational performance evaluations of candidate designs. This task provides baseline and excursion scenario descriptions in documentary and digital form for use in BMDO TMD cost and operational effectiveness analyses (COEA). These descriptions are the only approved threat employment portrayals scenarios using these characterizations are critical to the analysis of alternative ballistic missile architectures, the performance assessments of potential technology System Threat Scenario Generation Task. The accurate specification and characterization of ballistic missiles and the appropriate development and integration of authorized for acceptable BMDO analysis. This task:

Identifies user needs for threat scenario descriptions.

Identifies analyses needed to fully specify and characterize the threat missile systems, penetration aids, tactics, etc., and ensures the analyses are accomplished.

Provides the analysis results to all interested agencies for review and comment.

Addresses critical threat issues which arise during the analysis process. Ensures all supporting agencies' views on threat issues are fully aired.

Reviews, approves, produces, and distributes all System Threat Scenario Descriptions.

Project 3265

Exhibit R-2 (PE 0603872C)

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l l	Exhibit) DATE February 1
BUDGET ACTIVITY 4 - Demonstration and Validation	PROJECT Name And Validation 3265
Produces threat	Produces threat computer digital media and supporting documentation for use by the development and acquisition communities.
Countermeasures In missile defense syst	Countermeasures Integration Task. The BMDO Countermeasure Integration (CMI) Program assists TMD acquisition program offices in developing theater ballistic missile defense systems that are robust to potential countermeasures and are practical and within the means of anticipated adversaries. Included in this mission are CMI mission are CMI and the countermeasures and are practical and within the means of anticipated adversaries. Included in this mission are CMI
Program support to susceptibilities and	Program support to the 1MD threat development process and advance waiting to DMDO system designeds. The DMDO CM LINE Countermeasures is providing designs susceptibilities and identifies potential countermeasures, determines credibility through analyses and tests, characterizes credible countermeasures by providing designs.
and performance per potential counterme system designers ea providing a flexible	and performance parameters, informs interingence and system developing countermeasures. Providing vulnerability and susceptibility information to the system designers early enables them to build robustness into their designs during the early stages of the system development process, a cost-effective means for providing a flexible high-performance design. The CMI Program takes a "rest-of-world" perspective in developing credible, potential countermeasures.
EY 1996 (\$ in Thousands):	:(spues):
- \$4,981	Intelligence Threat Task: Provided Capstone System Threat Assessment Report (STAR), specialty threats, targets analyses, operational threat environment intelligence assessments, management, and planning support.
- \$4,737	System Threat Scenario Generation Task: Continued development of threat system characterizations and scenario descriptions in response to the analysis needs of the system/element developers. Upgraded the threat modeling capability and produce digital media and supporting documentation through the Joint National Test Facility (JNTF). Developed scenarios depicting threat systems employed in theater
	environments.
- \$10,147	Countermeasures (CM) Integration Task: Performed TMD CM Red/Blue activities and counter-countermeasure parametric studies and 1 MD CM technical experiments and evaluations. Supported CM Skunkworks teams in conducting CM concept, design, fabrication, tests. Conducted
- \$19,865	non-technical analysis, oversignt, and database management. Total
FY 1997 (\$ in Thousands):	:(spuest)
- \$5,327	Intelligence Threat Task: Provide Capstone STAR, specialty threats, targets analyses, operational threat environment intelligence assessments,
- \$4,438	management, and planning support. System Threat Scenario Generation Task: Continue development of threat system characterizations and scenario descriptions in response to the
	analysis needs of the system/element developers. Upgrade the threat modeling capability and produce digital incura and supporting documentation through the INTF. Develop scenarios depicting threat systems employed in theater environments.
- \$11,654	Countermeasures (CM) Integration Task: Perform TMD CM Red/Blue activities and counter-countermeasure parametric studies and TMD CM technical experiments and evaluations. Support CM Skunkworks teams in conducting CM concept, design, fabrication, tests. Conduct non-
,	technical analysis, oversight, and database management.
- \$21,419	Total
Project 3265	Page 81 of 120 Pages Exhibit R-2 (PE 0603872C)

RDI	RDT&E BUDGET ITEM JUST	FICATION	V SHEET (JUSTIFICATION SHEET (R-2 Exhibit)	t)	DATE February 1997	rv 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	and Validation		PE NUMBER AND TITLE 0603872C Join	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	er Missile D		PROJECT 3265
FY 1998 (\$ in Thousands) - \$6,944 Intel man - \$5,389 Syste analy docu - \$15,653 Coun techn techn techn	Intelligence Threat Task: Provide Capstone STAR, specialty threats, targets analyses, operational threat environment intelligence assessments, management, and planning support. System Threat Scenario Generation Task: Continue development of threat system characterizations and scenario descriptions in response to the analysis needs of the system/element developers. Upgrade the threat modeling capability and produce digital media and supporting documentation through the JNTF. Develop scenarios depicting threat systems employed in theater environments. Countermeasures (CM) Integration Task: Perform TMD CM Red/Blue activities and counter-countermeasure parametric studies and TMD CM technical experiments and evaluations. Support CM Skunkworks teams in conducting CM concept, design, fabrication, tests. Conduct nontechnical analysis, oversight, and database management.	one STAR, spec :: Continue dev relopers. Upgra lop scenarios de :: Perform TMD support CM Sku	ialty threats, tar elopment of thre de the threat mo picting threat sy CM Red/Blue i mkworks teams	gets analyses, opeat system charac deling capability stems employed activities and cou in conducting Ch	crational threat of terizations and sand produce diging the atter environternes of the concept, design	environment intelligence scenario descriptions in r gital media and supportionments. asure parametric studies in, fabrication, tests. Co	assessments, esponse to the ng and TMD CM nduct non-
EX 1999 (\$ in Thousands): - \$7,282 Intell mana - \$5,648 Syste analy docur - \$16,224 Coun techn techn	Intelligence Threat Task: Provide Capstone STAR, specialty threats, targets analyses, operational threat environment intelligence assessments, management, and planning support. System Threat Scenario Generation Task: Continue development of threat system characterizations and scenario descriptions in response to the analysis needs of the system/element developers. Upgrade the threat modeling capability and produce digital media and supporting documentation through the JNTF. Develop scenarios depicting threat systems employed in theater environments. Countermeasures (CM) Integration Task: Perform TMD CM Red/Blue activities and counter-countermeasure parametric studies and TMD CM technical experiments and evaluations. Support CM Skunkworks teams in conducting CM concept, design, fabrication, tests. Conduct nontechnical analysis, oversight, and database management.	one STAR, spec : Continue dev elopers. Upgra lop scenarios de : Perform TMD support CM Sku	ialty threats, tarelopment of threed the threat mo picting threat sy CM Red/Blue inkworks teams	gets analyses, opeat system charac deling capability stems employed activities and couin conducting CN	erational threat esterizations and sand produce diging the feeter environter-countermes A concept, designater	environment intelligence scenario descriptions in r gital media and supportiunents. ssure parametric studies. in, fabrication, tests. Co	assessments, esponse to the lg and TMD CM nduct non-
Acquisition Strategy: Funding is provided to e (MIPR); Scientific, Engineering, and Technica B. Program Change Summary (\$ in Thousands)	Acquisition Strategy: Funding is provided to executing agents who accomplish tasks under existing contracts via Military Interdepartmental Purchase Requests (MIPR); Scientific, Engineering, and Technical Assistance (SETA) contracts; and Federally Funded Research and Development Centers (FFRDCs) contracts. ' ' ' ' ' ' ' ' ' ' ' ' '	who accomplis (TA) contracts;	h tasks under ex and Federally Fu	isting contracts v ınded Research a	ia Military Inter nd Developmen	rdepartmental Purchase I rt Centers (FFRDCs) con	lequests tracts.
Previous President's Budget Current Budget Submit/President's Budget	et ssident's Budget	FX 1996 19,684 19,865	EX 1997 23,170 21,419	EX 1998 28,930 27,986	FX 1999 30,438 29,154	Total Cost 102,222 98,424	
Change Summary Explanation: Funding: Funding adju Project 3265	Summary Explanation: Funding: Funding adjustments made to support revisions in TMD core program schedules and requirements. Page 82 of 120 Pages	n TMD core pro Page 8	ore program schedules Page 82 of 120 Pages	and requirement		Exhibit R-2 (PE 0603872C)	72C)

RDT&E BUDGET ITEM J	M JUSTI	FICAT	ION SH	USTIFICATION SHEET (R-2 Exhibit)	2 Exhib	it)		DATE Feb	February 1997	7
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NUN 0603	PE NUMBER AND TITLE 0603872C Joint	тге Sint Thea	ter Miss	D TITLE Joint Theater Missile Defense	se	9R 32	РРОЈЕСТ 3265
Schedule: None										
Technical: None										
C. Other Program Funding Summary (\$ in Thousands)	sands)									
2400 NMD Program, PE 0603871C	FY 1996 E 730,656	EY 1997 828,864	<u>FY 1998</u> 504,091	EY 1999 393,085	EY 2000 309,748	EY 2001 309,584	EY 2002 391,858	FY 2003 392,433	To Compl Cont	Total Cost Cont
D. Schedule Profile										
Skunkworks Mission #2 Skunkworks Mission #3 Skunkworks Mission #5 Skunkworks Mission #6 Skunkworks Mission #7 Skunkworks Mission #8 Skunkworks Mission #9 Skunkworks Mission #9 Skunkworks Mission #9 Skunkworks Mission #10 TMD Capstone STAR Countermeasures Risk Assessment Process Semi-Annual Update (Starting 3Q/FY96)	EY 1996 2 3 X X X X X X X	4 X X	- × - EX	EY 1997 X X X X X X X X X X X X X X X X X X X	4 × × - ×	EY 1998 X X X X X	∞	-	E <u>Y 1999</u> 2 3 X	4
Project 3265			Page 83 of 120 Pages	20 Pages			Exhib	Exhibit R-2 (PE 0603872C))603872C)	

RE	RDT&E PROGRAM ELEMEN	GRAM EL	EMENT/	T/PROJECT COST BREAKDOWN (R-3)	COST B	REAKD(OWN (R-	3)	DATE	February 1997	766
BUDGET ACTIVITY 4 - Demonstration and Validation	ation and Va	alidation			PE NUMBEI 060387	PE NUMBER AND TITLE 0603872C Joint	Theater M	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense			РКОЈЕСТ 3265
A. Project Cost Breakdown (\$ in Thousands)	Breakdown (S in	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999	٠.		
a. Intelligence Threatb. System Threat Scenario Gence. Countermeasures IntegrationTotal	Intelligence Threat System Threat Scenario Generation Countermeasures Integration tal	tion		4,788 4,869 10,208 19,865		5,327 4,438 11,654 21,419	6,944 5,389 15,653 27,986	7,282 5,648 16,224 29,154	A1		
B. Budget Acquisition History and Planning Information (\$\in\) In Thousands)	sition History an	id Planning In	formation (\$ i	n Thousands)							
Performing Organizations:	mizations:		,								
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	ent Organization	<u>ସ</u>									
Support and Management Organizations	gement Organiza	tions									
DOE Sandia Lab					0 0	0 0	1,988	1,575	2,200		5,763
MIT Lincoln Lab					0	0	1,230	2,000	2.850		3,250
CM Tech Eval				-	,				î		666
Physitron 11SASSDC					0 0	430	0	0	0		430
Sandia TDP					0	1,500	00	00	1,136 0		1,136
Test and Evaluation Organizations Dynetics SPC CM	n. Organizations				0 0	2,340	400 2,213	400	3,300		3,140
Project 3265				Page	Page 84 of 120 Pages	iges		Expi	Exhibit R-3 (PE 0603872C)	06038720)	

RD	RDT&E PROGRAM ELEME	RAM EL	EMENT/P	NT/PROJECT COST BREAKDOWN (R-3)	COST B	REAKDO	WN (R-	3)	DATE	February 1997	760
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Val	lidation			PE NUMBER AND TITLE 0603872C Join	AND TITLE C Joint T	heater Mi	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense			PROJECT 3265
Contractor or	Contract	A 1510.14	Dorforming	Drojeot	Total						
Government Performing	or Funding	Obligation	Activity	Office	Prior to	Budget	Budget	Budget	Budget	Budget to	Total
Activity	Vehicle	Date	EAC	EAC	FY 1996	FY 1996	FY 1997	FY 1998	FY 1999	Complete	Program
Booz-Allen					0	2,223	1,966	0	0		4,189
SPC-Threat					0	1,906	2,000	2,000	2,000		7,906
Nichols-Threat					0	2,014	2,351	2,960	2,960		10,285
CHOP/Phillips					0	0	3,642	4443	6,358		14,443
MSIC					0	0	125	131	450		706
NAIC					0	0	125	131	450		200
TRW					0	3,720	1,944	1,148	1,460		8,272
Loral					0	1,130	532	353	450		2,465
Dept of					0	750	750	0	0		1,500
Commerce											
TBE					0	3,720	0	0	0		3,720
NGIC	•				0	0	0	1,250	0		1,250
IDA					0	0	0	2,000	0		2,000
Miscellaneous				,	0	132	0	3,445	5540		9,117
B. Budget Acquisition History and Planning Information Continued (S in Thousands)	tion History and	i Planning Inf	ormation Con	tinned (S in T	housands)						
D. Duuget Avduis	HIGH THISTOLY AND	1 1 181111118 4111	VI III III IVIII V		Tonilla and in						
Government Furnished Property:	ished Property:										
T	Contract Method/Type	Award or	Delivery		Total Prior to	Rudaet	Budoet	Budoet	Rudoet	Rudgetto	Total
Description	Vehicle	Date	Date		FY 1996	FY 1996	FY 1997	FY 1998	FY 1999	Complete	Program
Product Development Property	ant Property										
-											
Support and Management Property	ement Property										
Project 3265				Pag	Page 85 of 120 Pages	ges		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&	RE PROG	RDT&E PROGRAM ELEME	EMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3	<u>(1)</u>	DATE	February 1997	197
BUDGET ACTIVITY 4 - Demonstration and Validation	on and Val	idation		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C. Joint T	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ssile Defe			PROJECT 3265
C N Item o Description V	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Test and Evaluation Property	operty									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	lopment Aanagement uation				1,930	5,371	6,425 21,561	6,186 22,968		19,912
Total Project					19,865	21,419	27,986	29,154		98,424
			-							
Project 3265			Pag	Page 86 of 120 Pages	çes		Exhil	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&E BUDGET ITEM		TIFICA	TION S	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhit	oit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 0 0 0	PE NUMBER AND TITLE OG03872C Joint Theater Missile Defense	гіт <u>г</u> е oint Thea	ater Miss	ile Defen	se	3 5	РРОЈЕСТ 3270
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3352 Modeling and Simulations	71,362	64,180	73,173	72,984	74,959	74,961	78,333	75,661	75,661 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

approach reduces the need for more costly live fire missile test programs and establishes requirements for future technology needs. It promotes enhancements of M&S technologies that support: the acquisition process; the development and fielding of operational capabilities; and the development of common tools, methodologies, and provide analysis, integration, demonstration, and performance verification of BMD systems. The JNTF and ARC/SC facilities and the Joint Missile Defense Network projected, alternative, and demonstrated performance capabilities of Theater Missile Defense (TMD) and National Missile Defense (NMD) systems. These large and utilization of these facilities and to provide verification, validation, and accreditation (VV&A) of the models, simulations, and systems portrayed. This cost effective Center (ARC/SC) in Huntsville, AL. These facilities operate in a distributed integrated simulation environment and host the modeling and simulation wargames that Portions of this processing capability are housed at the Joint National Test Facility (JNTF) in Colorado Springs, CO, and the Advanced Research Center/Simulation complex M&S tools require high-performance vector and parallel processing super-computers, scalar processors, and advanced graphic workstations for operation. (JMDN), which links BMD Contractors, Services and other DoD government facilities, are utilized by all Services. Procedures are established to ensure efficient This project provides for the development/modification and validation of modeling and simulation (M&S) techniques and tools that are critical in assessing the protocols beneficial to data exchange, integration of various modeling and simulations, and software reusability of M&S applications.

performance of existing and conceptual extended air and missile defense systems with the added complexity of theater missile defense threats. This is a multi-node test Communication (BM/C3) systems. The capabilities of the EADTB are being incrementally developed and accredited with the Services. EADSIM is a low to medium detail simulation system that operates on a stand-alone workstation. This simulation is used for architectural analysis of EAD systems and provides user interface for This project funds the development, operation, and VV&A of the Extended Air Defense Test Bed (EADTB) and the Extended Air Defense Simulation (EADSIM) which support the analysis required for TMD program acquisition and integration. The EADTB is a flexible distributed simulation tool that can determine the bed that is comprised of high and medium fidelity models of sensors, environments, weapon systems, threats, and Battle Management Command, Control and scenario preparation and model description.

analysis, integration, demonstration, and performance verification for TMD systems. It ensures joint usage of simulation tool resources, supports allied and friendly M&S activities also funded by this project include: development, enhancement, and maintenance of the theater test beds and conduct of wargames that provide the international participation and cooperation in wargaming exercises. This project focuses M&S support in five primary areas: standardization, assessments, development/modification, computer architectures/networks, and program management for BMDO and Service M&S programs.

sharing approach ensures cooperation, contributes to achieving synergy across the efforts, and minimizes duplication of modeling and simulation resources. The total Funding for these facilities is distributed through Project 3352. Three Program Elements (PEs), (NMD,TMD, and Support Technology) provided funding. This cost

Project 3270

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Exhibit R-2 (PE 0603872C)

X	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) PATE February 1997
BUDGET ACTIVITY 4 - Demonstratic	PROJECT ACTIVITY 4 - Demonstration and Validation 3270
funding profile re corresponding inc includes: comput multiple experime	funding profile remains flat on an annual basis, with adjustments for inflation. For example, the decrease in TMD funding for JNTF in FY97 is offset by a corresponding increase in NMD funding. These Pils in the costs for operations and maintenance of the JNTF and ARC/SC facilities, and the JMDN which includes: computer hardware and software, communication works, security, and other essential capabilities necessary to develop and operate reconfigurable, and multiple experiment test bed environments. This document describes the TMD portion of funding for these activities.
FY 1996 (\$ in Thousands): - \$31,983 Provi prodi the B	Provided super-computing and wargaming resources at JNTF. Continued use of the JNTF for threat scenario generation and threat tape production for U.S. and international Wargames and Exercises. Continued to provide studies and analysis expertise and resources to BMDO and the BMD community to address BMD issues across the entire development and operational spectrum. Continued support as the central hub of the JMDN linking Services, contractors, and other DoD/government facilities. Began the development of the BMD Simulation Support Center
- \$1,695	(SNC). Provided JNTF TMD M&S support in six primary areas: standardization, assessments, development/modification, accreditation, computer architecture/networks, and program management for BMDO and Service M&S programs.
- \$22,749	Delivered EADTB Version 3 (this provides basic simulation capability for small TMD scenarios to support BM/C3 special studies) and Version 4 (upgrades include ground clutter, reporting responsibility, functional sensor, and terrain following algorithms); incorporation of DIS capability, provided EADTB support to STC, THAAD, and BM/C3 studies and analysis. Provided EADSIM baseline maintenance; continued EADTB VV&A activities; provided EADTB site support to all nodes, including the STC node. Began the development of Service certified Specific
- \$8,204	System Representations (SSRs) for EADTB. This figure also included civilian salaries. Provided super-computing resources at the ARC/SC to operate a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements (THAAD, PATRIOT, and BM/C3 components), EADTB, EADSIM, and the THAAD Test Bed. Continued to support maintenance, modification, and enhancements of/to: CFD analysis; COEA of TMD systems; technical have analysis; concent studies, and alternative trade-off analysis. This figure also include Army civilian salaries.
- \$3,515	Provided Army TMD M&S support in six primary areas: standardization, assessments, development/modification, accreditation, computer architecture/networks, and program management for BMDO and Service M&S programs.
- \$1,271	Provided Air Force TMD M&S support in six primary areas: standardization, assessments, development/modification, accreditation, computer architecture/networks, and program management for BMDO and Service M&S programs.
- \$1,330 - \$615	Provided Navy TMD M&S support in six primary areas: standardization, assessments, development/modification, accreditation, computer architecture/networks, and program management for BMDO and Service M&S programs. Provided TMD M&S support in six primary areas: standardization, assessments, development/modification, accreditation, computer
- \$71,362	architecture/networks, and program management for BMDO and Service M&S programs. Total
Project 3270	Page 88 of 120 Pages Exhibit R-2 (PE 0603872C)

RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) Potter February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PROJECT PENUMBER AND TITLE PROJECT PROJE
FY 1997 (\$ in Thousands):	
- \$15,310	Deliver 4.1, 4.2, and 4.3 (upgrades include threat tape enhancements, EADTB site support - including JN1F, Ft. Bliss, NSWC, TACCSF, and NC3A). Continue development of EADTB Service certified SSRs and EADTB deliver Version 5 (upgrades include limited ground force interactions, and additional space based sensor enhancements). Limited EADSIM and EADTB site support. Continue EADTB VV&A activities. Provide EADSIM baseline maintenance. This figure also includes civilian salaries.
- \$26,075	Provide infrastructure and core capability funding for the JNTF. This includes: operations and maintenance of the facilities, personnel, computer hardware and software, communications, networks, systems engineering, security, and other capabilities essential to common system support to the BMDO; super-computing and wargaming resources for TMD Wargame and Workshop efforts; studies and analysis expertise and resources to the BMD community to address BMD issues across the entire development and operational spectrum; and development and operation of the
	Joint TMD Planning Tool; development of the BMD Simulation Support Center; contribution to the JNTF Modernization/Rolling Technology Update; and continued support to the Information System Security Engineering/Multi-Level Security program. Continue support as the central hub of the JMDN linking Services, contractors, and other DoD/government facilities. This figure also includes JNTF civilian salaries.
- \$3,853	Provide JNTF Project funding to support: one TMD Wargame, one TMD Workshop, Human in Control Test Bed modifications, and the development of the BMD SSC. This area also provides JNTF support in five primary M&S areas: standardization, assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. Also support the development of DPS and JDN Common Rule Sets SSRs for the EADTB program.
- \$12,864	Provide super-computing resources at the ARC/SC to operate a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements including the EADTB, EADSIM, and the THAAD Test Bed. Major areas of support include maintenance, modification, and enhancements of/to: CFD analysis; COEA of TMD systems; technical base analysis; concept support include maintenance.
- \$1,537	Provide BMDO M&S support in five primary areas: standardization, assessments, development/modification, computer architecture/networks, and propram management for BMDO and Service M&S programs.
- \$2,078	Provide Army M&S support in five primary areas: standardization, assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. Also support the development of Army certified THAAD, JTAGS, Corps SAM, PAC-2 and PAC-3 SSRs for the EADTB program.
9998 -	Provide Air Force M&S support in five primary areas: standardization, assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. Also support the development of Air Force certified AWACS SSR for the FADTB program.
- \$599	Provide Navy M&S support in five primary areas: standardization, assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs. Also support the development of a Navy certified TBMD Aegis SSR for the EADTB program.
- \$1,198 - \$64,180	Modernize JNTF's computer capabilities based on supporting BMD program priorities. Total
Project 3270	Page 89 of 120 Pages Exhibit R-2 (PE 0603872C)

	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstrati	BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	
EY 1998 (\$ in Thousands) - \$40,722 Prov hard- the H to th Joint Upd hub o	Provide infrastructure and core capability funding for the JNTF. This includes: operations and maintenance of the facilities, personnel, computer hardware and software, communications, networks, systems engineering, security, and other capabilities essential to common system support to the BMDO; super-computing and wargaming resources for TMD Wargame and Workshop efforts; studies and analysis expertise and resources to the BMDO; super-computing and wargaming resources for TMD Wargame and Workshop efforts; studies and analysis expertise and resources to the BMD community to address BMD issues across the entire development and operational spectrum; and development and operation of the Joint TMD Planning Tool; development of the BMD Simulation Support Center; contribution to the JNTF Modernization/Rolling Technology Update; and continued support to the Information System Security Engineering/Multi-Level Security program. Continue support as the central hub of the JMDN linking Services, contractors, and other DoD/government facilities. This figure also includes JNTF civilian salaries. Deliver EADTB Phase I SSRs and user required enhancements to support SSR development, and Version 6. Provide limited site support to all	he JNTF. This includes: operations and maintenance stems engineering, security, and other capabilities ess for TMD Wargame and Workshop efforts; studies the entire development and operational spectrum; an imulation Support Center; contribution to the JNTF em Security Engineering/Multi-Level Security progree DoD/government facilities. This figure also inclucements to support SSR development, and Version 6	e of the facilities, personnel, computer sential to common system support to and analysis expertise and resources in development and operation of the Modernization/Rolling Technology am. Continue support as the central udes JNTF civilian salaries.
- \$7,907	EADTB users. Provide EADSIM baseline maintenance. Continue limited EADTB VV&A activities. Port EADTB to an affordably in Graphic platform. This area also funds civilian salaries. Provide super-computing resources at the ARC/SC to operate a multiple experiment test bed environment for conducting research and development activities for the Army's Ground Based Elements including the EADTB, EADSIM, the THAAD Test Bed, TISES, and TMDSE. Major areas of support include maintenance, modification, and enhancements of/to: CFD analysis; COEA of TMD systems; technical base	e. Continue limited EADTB VV&A activities. Port s. s. perate a multiple experiment test bed environment flements including the EADTB, EADSIM, the THAM ion, and enhancements of/to: CFD analysis; COEA	EADTB to an affordable an order conducting research and AD Test Bed, TISES, and TMDSE. of TMD systems; technical base
- \$7,173	analysis; concept studies; and alternative trade-off analysis. Provide M&S support in five primary areas: standardization, assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs.	ysis. ation, assessments, development/modification, compograms.	puter architecture/networks, and
- \$1,203	Continue to modernize BMDO's computer capabilities based on supporting BMD program priorities. Continue upgrade of host processing resources to address inadequate user response time; establishment of a WAN; upgrade supercomputers to support modeling and simulations; implementation of new technology to support multimedia applications replace obsolete computational resources; and implement nearline and online mass storage to support user software analysis.	based on supporting BMD program priorities. Coni ablishment of a WAN; upgrade supercomputers to si dia applications replace obsolete computational reso	tinue upgrade of host processing upport modeling and simulations; urces; and implement nearline and
- \$2,911	Provide JNTF Project funding to support: one TMD Wargame, one TMD Workshop, Human in Control Test Bed modifications, and the development of the BMD SSC. This area also provides JNTF support in five primary M&S areas: standardization, assessments, development/modification, computer architecture/networks, and program management for BMDO and Service M&S programs.	support: one TMD Wargame, one TMD Workshop, Human in Control Test Bed modifications This area also provides JNTF support in five primary M&S areas: standardization, assessments, puter architecture/networks, and program management for BMDO and Service M&S programs.	st Bed modifications, and the lization, assessments, vice M&S programs.
- \$73,173	Total		
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	R	RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET 4 - De	BUDGET ACTIVITY 4 - Demonstratio	вирсет АстіVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	PROJECT 1Se 3270
五 -	FY 1999 (\$ in Thousands): - \$40,443 Provi	usands): Provide infrastructure and core capability funding for	unds): Provide infrastructure and core capability funding for the JNTF. This includes: operations and maintenance of the facilities, personnel, computer	the facilities, personnel, computer
		hardware and software, communications, networks, s the BMDO; super-computing and wargaming resourc	hardware and soltware, communications, networks, systems engineering, security, and onest experiment to communications and resources the BMDO; super-computing and wargaming resources for TMD Wargame and Workshop efforts; studies and analysis expertise and resources	analysis expertise and resources
		to the BMD community to address BMD issues acros Ioint TMD Planning Tool; development of the BMD	to the BMD community to address BMD issues across the entire development and operational spectrum; and development and operation of the Joint TMD planning Tool; development of the BMD Simulation Support Center; contribution to the JNTF Modernization/Rolling Technology	evelopment and operation of the dernization/Rolling Technology
		Update; and continued support to the Information Sylhub of the JMDN linking Services, contractors, and o	Update; and continued support to the Information System Security Enginecring/Multi-Level Security program. Continue support as the central hub of the JMDN linking Services, contractors, and other DoD/government facilities. This figure also includes JNTF civilian salaries.	Continue support as the central SINTF civilian salaries.
1	\$14,409	Deliver EADTB development and enhancements. Provide limited site support to a Continue limited FADTB VV&A activities. This area also funds civilian salaries.	Deliver EADTB development and enhancements. Provide limited site support to all EADTB users. Provide EADSIM baseline maintenance.	ADSIM baseline maintenance.
ı	\$7,754	Provide super-computing resources at the ARC/SC to	Provide super-computing resources at the ARC/SC to operate a multiple experiment test bed environment for conducting research and Accidental activities for the Army's Ground Based Elements including the EADTB, EADSIM, the THAAD Test Bed, TISES, and TMDSE.	onducting research and TMDSE.
		Major areas of support include maintenance, modification,	Major areas of support include maintenance, modification, and enhancements of/to: CFD analysis; COEA of TMD systems; technical base	IMD systems; technical base
I	\$6,068	Provide M&S support in five primary areas: standard	analysis, concept structure, and a management of the primary areas: standardization, assessments, development/modification, computer architecture/networks, and Provide M&S support in Property areas: standardization, assessments, development/modification, computer architecture/networks, and	r architecture/networks, and
į	\$1,409	program management for bivide and service mass programs. Continue to modernize BMDO's computer capabilities based of managementation of new techniques.	program management for blad of an activity programs. Continue to modernize BMDO's computer capabilities based on supporting BMD program priorities. Continue upgrade of supercomputers to continue and simulations: implementation of new technology to support multimedia applications: replace obsolete computational	e upgrade of supercomputers to lace obsolete computational
1	\$2,901	resources. Provide INTF Project funding to support: one TMD V	resources. Provide JNTF Project funding to support: one TMD Wargame, one TMD Workshop, Human in Control Test Bed modifications, and the	sed modifications, and the tion. assessments.
ı	\$72,984	development of the DMD 35C. This area also proved development/modification, computer architecture/net Total	nus area and profess, and program management for BMDO and Service M&S programs.	M&S programs.
₩ 	squisition Strate	22: The tasks in this project are met through full and open	Acquisition Strategy: The tasks in this project are met through full and open competition. Primary M&S support is performed at the JNTF, ARC/SC, and other test	E JNTF, ARC/SC, and other test
	d facilities. The us Award Fee. eration of the E.	bed facilities. The JNTF support contracts were awarded to Loral (Operating Award Fee. The ARC/SC contractor is a Cost Plus Fixed Fee (CPFF) operation of the EADTB is Hughes Aircraft, which was awarded a Cost Plu	bed facilities. The JNTF support contracts were awarded to Loral (Operations & Maintenance) and 11km (Research & Development) in 1773, both Contractor for development and Plus Award Fee. The ARC/SC contractor is a Cost Plus Fixed Fee (CPFF) with COLSA, first awarded in June of 1989. The prime contractor for development and operation of the EADTB is Hughes Aircraft, which was awarded a Cost Plus Award Fee (CPAF) contract in September 1989.	t) in F 175, boin contacts are cost contractor for development and
Project 3270	13270	Pa	Page 91 of 120 Pages Exhib	Exhibit R-2 (PE 0603872C)

BUDGET ACTIVITY 4 - Demonstration and Validation B. Program Change Summary (\$ in Thousands) Previous President's Budget Current Budget Submit/President's Budget		PE NUMBER AND TITLE	T CIAN CECA						
B. Program Change Summary (\$ In Thousands) Previous President's Budget Current Budget Submit/President's Budget		090	3872C JC	ாட oint Thea	PE NUMBER AND TITLE OG03872C Joint Theater Missile Defense	e Defen	Se	PR(РРОЈЕСТ 3270
Previous President's Budget Current Budget Submit/President's Budget									
	EX 1996 69,409 71,362	ĬΤ	E <u>Y 1997</u> 53,042 64,180	FY 1998 61,204 73,173	EY 1999 62,318 72,984		Total <u>Cost</u> 245,973 281,699		
Change Summary Explanation: Funding: None Schedule: None Technical: None									
C. Other Program Funding Summary (S in Thousands)									
3352 Modeling and Simulation, PE 0603173C 0 3352 Modeling and Simulation, PE 0603171C 16,041	EY 1997 2,002 32,803	EY 1998 1,554 22,308	FY 1999 1,898 22,535	EX 2000 643 17,744	EY 2001 1,512 18,876	FY 2002 1,544 19,798	EY 2003 1,582 19,722	To Compl Cont'd Cont'd	Total Cost
D. Schedule Profile									
EV 1996	2 E	1 2	EY 1997 2 3	4	EY 1998 2 3	∞ £	1 E	FY 1999 2 3	4
Delivery of EADTB Version 3 X GBR/THAAD Integration Testing X NMD/TMD Wargane 96-A/B Delivery of FADSIM Ver 6.0	.×								
oftware 	;	×							
Simulation Support Center PDR Conduct TMD GBR Software Testing Complete EADTB TBMD SSR Dvmt EADTB SSR Development PDR	<	×××		×					
Project 3270		Page 92 of 120 Pages	20 Pages			Exhibi	Exhibit R-2 (PE 0603872C)	103872C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Ex	hibit		<u>a</u>	DATE Fet	February 1997	997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Join	Joint T	heate	TITLE Joint Theater Missile I	Defense	Ð		PROJECT 3270
1 2 3 4	FY 1997 2 3	4		$\frac{\text{FY } 1998}{2}$	4	-	FY 1999 2 3	4
Conduct "ARGUS 2000" PDR TTMDP Interim Release - Ver 0.5								
view								
Coordinate Wargame 2000 Requirements	×							
Document (PDR)	×							
TPT Requirement Scrubber (Assessment)	×							
Simulation Support Center CDR				;			;	
EA TAD BMC4I Wargame	×			×			×	
Begin Wargame 2000 design/development	× >							
Form BMDO Wargame Federation for the	≺							
Wargame 2000 CDR	>							
Delivery of EAD B Version 4.2	< >							
Complete EADTB CMD SSR Dvmt	< >							
EAD I B SOK DEVELOPHISH CDA	: ×							
Stort 1001 Assessitetti Complete RMD M&S Roadman	×							
Complete Data Accounting		×		×			×	
Conduct "ARGUS 2000" CDR	×							
JTMDP System Specifications Review	×			×				
Delivery of EADTB Version 4.3		×			;			
JTMDP Software Requirements Review		×;			×			
Deliver EADTB Version 5		×	;					
Host EA TAD C4I Workshop			×					
Complete V&V of EADTB CMD SSR			×					
JTMDP Ver 1.0 Release			×					
Conduct Wargame 2000 Integration				×				
Testing/Demo				,				
Complete EADTB SSR Dvmt Phase I				× >				
Deliver EADSIM Version 7.0				< ×				
	,				:		1	
Project 3270	Page 93 of 120 Pages				Exhibit	3-2 (PE 0	Exhibit R-2 (PE 0603872C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	1
Update M&S Roadmap Conduct Wargame 2000 Integration Testing with ARGUS Deliver EADTB Version 6 JTMDP Ver 2.0 Release Deliver Wargame 2000; IOC TMD GBR S/W Testing Deliver EADTB Version 7 EADTB Final FQT	1 2 3 4 1 2 3 X X X X X X X X X X X X X X X X X X	EV 1999 X X X X X X X X X X X X
Project 3270	Page 94 of 120 Pages	Exhibit R-2 (PE 0603872C)

RDT	RDT&E PROGRAM ELEME	SRAM EL		NT/PROJECT COST BREAKDOWN (R-3)	COSTE	REAKD	OWN (R-	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ion and Va	lidation			PE NUMBE 060387	PE NUMBER AND TITLE 0603872C Joint	Theater M	PENUMBER AND TITLE 0603872C Joint Theater Missile Defense	ense	PI 3	PROJECT 3270
A. Project Cost Breakdown (\$ in Thousands)	akdown (\$ in	[housands]									
				FY 1996		FY 1997	FY 1998	FY 1999			
a. Extended Air Defense Test Bed Development	ense Test Bed I)evelopment		20,963		12,906	10,798	11,831			
	laries	ı		3,903	23	2,404	2,459	2,578			
c. Navy Civilian Salaries	aries			722	7.7	466	670	657			
d. JN I F CIVIII Salaries Service (Army Navy Air Force) M&S Support	aries avv. Air Force)	M&S Support		2,014	+ 40	3,343	0 0	0.6,2			
	ort),			1,695	5	3,853	2,911	2,901			
g. BMDO M&S Support	port			820	0;	1,537	7,173	6,068			
	Modernization				0	0	1,203	1,409			
i. JNTF Computer Modernization	fodernization				0	1,198	0	0			
j. Advanced Research Center	h Center			4,565	5	9,648	5,930	5,816			
k. Simulation Center				1,522		3,216	1,977	1,939			
 JNTF O&M (Loral) 	al)			15,007		10,976	25,797	25,774			
m. JNTF R&D (TRW)	(M)			8,200	0 4	8,452	6,631	6,515			
n. JNTF Contractor Support	Support			5,835		3,100	4,667	4,586			
Total				71,362		64,180	73,173	72,984			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	on History an	d Planning Inf	ormation (S i	n Thousands)							
Performing Organizations:	zations:										
tor or nent ing	Contract Method/Type or Funding	Award or Obligation	Performing Activity	Project Office	Total Prior to	Budget	Budget	Budget	Budget	Budget to	Total
Activity	Vehicle	Date	EAC	EAC	FY 1996	FY 1996	FY 1997	FY 1998	FY 1999	Complete	Program
Product Development Organizations Colsa Corp -ARC SS/CPFF	t Organizations SS/CPFF					4,565	. 9,648	5,930	5,816	Cont'd	25,959
				Dag	Dane 05 of 130 Pages	0,000		H H	E-hihit D-3 (DE 0603879C)	(76786090	
Project 3270				X 7	1001 1000	uges			וסור זאבט לר ב	000001201	

RD.	RDT&E PROC	PROGRAM ELEMEN		T/PROJECT		REAKD(COST BREAKDOWN (R-3)	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	ition and Va	lidation			PE NUMBEF 060387;	PE NUMBER AND TITLE 0603872C Joint	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	issile Def		,	PROJECT 3270
Contractor or	Contract										
Government	Method/Type	Award ov	Performing	Project	Total				•		İ
reriorming	or Funding	Obligation	Activity	Uffice	Prior to	Budget	Budget	Budget	Budget	Budget to	Total
Madison	Comp/CPFF	Laic	EAC	EAC	FY 1996	1 523	3 2 16 3 2 16	EY 1998	EY 1999	Complete	Program 9,653
Research Corp -						7764	017,0	1,7,1	1,730		ccn,o
Sim Center											
Hughes Aircraft -	CPAF	Sep-89				20,963	12,906	10,798	11,831	Cont'd	56,498
EADTB Dvmt											
Loral - JNTF						15,007	10,976	25,797	25,774	Cont'd	77,554
TRW - JNTF						7,478	8,452	6,631	6,516	Cont'd	29,077
BMDO M&S						615	1,537	7,173	890'9	Cont'd	15,393
Service M&S						7,811	7,196	2,911	2,901	Cont'd	20,819
BMDO Computer						0	0	1,203	1,409	Cont'd	2,612
Mods											
JNTF Computer	٠					0	1,198	0	0	Cont'd	1,198
Mods											
Support and Management Organizations	ement Organizat	tions									
Army Civilian						3,903	2,404	2.459	2.578	Cont'd	11.344
JNTF Civilian						2,941	3,081	2,957	2,910	Cont'd	11.889
Navy Civilian						722	466	670	657	Cont'd	2.515
JNTF - NAAS						5,835	3,100	4,667	4,586	Cont'd	18,188
Test and Evaluation Organizations	Organizations										
. B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	tion History an	d Planning In	formation Con	tinued (S in Tl	lousands)						
	1										
Government Furnished Property:	ished Property:										
Project 3270				Pag	Page 96 of 120 Pages	sədi		П	Exhihit R-3 (PF 0603872C)	06038720)	
									- 1 C V V V V V V V V V V V V V V V V V V	000001201	

RDT&E PRO	GRAM EL	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BE	REAKDO	WN (R-3		DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	alidation		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	heater Mi	DE03872C Joint Theater Missile Defense	ense	⊕ 6	РRОЈЕСТ 3270
Contract Method/Type Item or Funding Description Vehicle	e Award or Obligation Date	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property									
Support and Management Property	×								
Test and Evaluation Property									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation				57,961 13,401	55,129 9,051	62,420 10,753	62,253 10,731		237,763 43,936
Total Project		•		71,362	64,180	73,173	72,984		281,699
Project 3270		Pag	Page 97 of 120 Pages	ges		Exh	ibit R-3 (PE	Exhibit R-3 (PE 0603872C)	

RDT&E BUDGET ITEM J		TIFICA	USTIFICATION SHEET (R-2 Exhibit	HEET (R	1-2 Exhil	Pi.		DATE Fel	February 1997	76
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 000	PE NUMBER AND TITLE 0603872C Joint	TITLE Joint The	DE03872C Joint Theater Missile Defense	ile Defer		1 60	РRОЈЕСТ 3352
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3354 Targets Support	23,046	22,842	27,603	18,721	42,755	42,226	42,463	42,578	Continuing	Continuing
A. Mission Description and Budget Item Justification This project provides core funding for targets and services needed to support the testing and evaluation of all Theater Missile Defense (TMD) programs, in particular This project provides core funding for targets and services needed to support the testing and evaluation of this project is a segment of the BMDO Consolidated Targets Program (CTP). The CTP mission is to provide threat representative ballistic missile target system support to interceptor and seement of the BMDO Consolidated Targets Program (CTP). The CTP mission is to provide threat representative ballistic missile target system support to interceptor and seement and acquisition programs. Each target system is tailored and reconfigured to meet unique mission requirements for each test. This project is an seement and demonstration of target systems is tailored and reconfigured to meet unique mission requirements for each test. This project funds the development and demonstration of target systems and Poreign Military Acquisition (FMA) targets to support The TMD programs fund the actual acquisition of Theater targets development of this program. The Theater High-Altitude Area Defense (THAAD) system, Patriot Advanced Capability - 3 (PAC-3) system, Navy Area TBMD (Lower Tier) and Navy Theater-Wide TBMD (Upper Tier) systems require target system, part area and evaluation. The THAAD program intends to use the HERA target system with planned laumches at White Sands, NM and from Wake Island. The Navy will use the air launch target system. The PAC-3 program will use STORM and Miller and a long range a launch target system. The PAC-3 program will be submitted target and a long range tail and a long range (1000-2900 Km) winged air-launched target to satisfy the collective target requirements of THAAD and both Navy programs for multiple simultaneous engagements, multi-axis scenarios, and short range and long-range threat target presentations. The project is also developing reentry vehicles to simulate the fu	cation and services 1 D and Navy 7 Program (CTF ams. Each ta target system fevelopment of ier) and Navy s to use the H illy, THAAD long range ai te air launch tr op ballistic ta rams for mult	reeded to su Theater -Wic Theater -Wic The system S and Foreig of this progra Theater-W ERA target stesting in the flaunch targ riget launch targ	pport the tess le TBMD, U mission is to instance and n Military A am. The The ide TBMD (I system with I e Pacific requestated at Pacific red at Pacific ng range (10 ng range (10 teous engage te the full range.	ting and eva SMC Hawk, o provide thu d reconfigu cquisition (I ater High-A Upper Tier) planned laur uires short ra The PAC-3 p Missile Ran 00-2900 Kn	luation of all and the US reat represented to meet u TMA) targets ltitude Area systems requiches at Whit ange (200-60 rogram will ge Facility (I n) winged ait i-axis scenar	ices needed to support the testing and evaluation of all Theater Missile Defense (TMD) programs, in particular avy Theater -Wide TBMD, USMC Hawk, and the US Air Force Air Borne Laser (ABL). This project is a (CTP). The CTP mission is to provide threat representative ballistic missile target system support to interceptor tharget system is tailored and reconfigured to meet unique mission requirements for each test. This project stems and Foreign Military Acquisition (FMA) targets to support TMD test and evaluation. The TMD programs lent of this program. The Theater High-Altitude Area Defense (THAAD) system, Patriot Advanced Capability -Navy Theater-Wide TBMD (Upper Tier) systems require target system support to accomplish their planned test the HERA target system with planned launches at White Sands, NM and from Wake Island into the Kwajalein AD testing in the Pacific requires short range (200-600 Km) and long range (1000-2900 KM) target ge air launch target system. The PAC-3 program will use STORM and HERA targets launched from White not target launched at Pacific Missile Range Facility (PMRF) (Barking Sands, Kauai, HI). This project is it target and a long range (1000-2900 Km) winged air-launched target to satisfy the collective target multiple simultaneous engagements, multi-axis scenarios, and short range and long-range threat target ehicles to simulate the full range of threat targets.	ssile Defens ir Borne Lai ic missile ta on requirem (MD test an (AAD) syste stem suppor A and from ong range (and HERA king Sands, urget to satis rt range and	e (TMD) pro ser (ABL). T rget system s ents for each d evaluation. m, Patriot A t to accompl Wake Island 1000-2900 K targets laum Kauai, HI). T fy the collect long-range t	grams, in particular support is support to in test. This particular that the TMD day and the Kwall support the Kwall target ched from Wall project tive target threat target	rticular i a lerceptor roject programs sability - 3 med test ajalein Thite is
 EY 1996 (\$\frac{\$}\$ in Thousand\$\$): \$6,800 Continued support of FMA target systems and development to support TMD EMD test and evaluation. \$2,646 Continued development and demonstration of new HERA and STORM target configurations, supporting THAAD Dem/Val, PAC-3 EMD and Navy Area. \$5,800 Developed short range air drop target capability to meet requirements. \$4,995 Provided technical support for targets program operations at the executing agent. \$2,805 Initiated development of advanced payload (modular target reentry vehicle) for PAC3, THAAD EMD. \$23,046 Total 	MA target syst and demonsti air drop target ort for targets f advanced pa	tems and devration of nevception of nevception of program opyload (modu	velopment to v HERA and o meet requi erations at th	support TN. STORM tai rements. le executing	ID EMD test rget configur agent.) for PAC3,	systems and development to support TMD EMD test and evaluation. Instration of new HERA and STORM target configurations, supporting reget capability to meet requirements. Instructions at the executing agent. Instruction operations at the executing agent. Instruction of payload (modular target reentry vehicle) for PAC3, THAAD EMD.	ion. orting THA. AD.	AD Dem/Val	I, PAC-3 EN	ID and
FY 1997 (\$ in Thousands): - \$8,500 Continue support of FMA target systems and target development to support TMD test and evaluation. - \$4,862 Continue development and demonstration of HERA and STORM target configurations.	A target syste ind demonstra	ms and targetion of HER	et developme A and STOF	ent to suppos	rt TMD test ¿ infigurations.	and evaluatic	on.			



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Project 3352

Exhibit R-2 (PE 0603872C)

2	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) DATE Febru	February 1997
BUDGET ACTIVITY 4 - Demonstratio	BUDGET ACTIVITY 4 - Demonstration and Validation 603872C Joint Theater Missile Defense	PROJECT 3352
- \$2,208 - \$7,172 - \$100 - \$22,842	Demonstrate short range air drop target capability to meet requirements. Technical support for targets program operations at executing agent. Initiate development of advanced payload (long range threat representative target) for THAAD, Navy Theater Wide. Total	
EY 1998 (\$ in Thousands): - \$2,000 Initia - \$9,000 Initia - \$1,362 Conti - \$10,241 Conti - \$2,000 Conti - \$2,000 Provi - \$3,000 Provi	Initiate EMD of Short Range air drop ballistic missile target for Navy Area Wide and THAAD. Initiate Dem/Val of Long Range target for Navy Theater Wide THAAD. Continue development and sensor characterization of advanced target payloads for THAAD, Navy Theater Wide. Continue development of targets capability to meet additional requirements for Navy, THAAD, EMD. Continue support of FMA target systems. Provide technical support for targets program operations at the executing agent. Total	
EY 1999 (\$ in Thousands): - \$3,300 Cont - \$6,800 Initia - \$1,500 Cont - \$3,121 Cont - \$1,000 Cont - \$3,000 Provi - \$18,721 Total	Continue EMD of Short Range air drop ballistic missile target for Navy Area Wide and THAAD Initiate EMD of Long Range target for Navy Theater Wide and THAAD. Continue development and sensor characterization of advanced target payloads for THAAD and Navy Theater Wide. Continue development of target capability to meet additional target requirements for Navy Theater/Area and THAAD EMD. Continue support of FMA target systems Provide technical support for targets program operations at the executing agent. Total	
Acquisition Strateg Targets and Test an procured with a con has delivered three development and do OH. The air drop of launch will support meet a delivery req	Acquisition Strategy: The Hera and Storm target systems are being developed by the executing agent: U.S. Army, Space and Strategic Defense Command (SSDC), Targets and Test and Evaluation (TT&E) office in Huntsville, AL. The Hera target system, being developed by Coleman Research Corporation (Orlando, FL) is being procured with a contract for a quantity of 25 targets. Two additional options are available for procurement of 25 targets in each option. Orbital Sciences Corporation has delivered three Storm Maneuvering Tactical Target Vehicles (MTTV). Additional targets include the Lance target system and Foreign Material Acquisition. The development and demonstration of the air drop ballistic target system is being managed by the executing agent: National Air Intelligence Center, Wright Patterson AFB, OH. The air drop demonstration contractor team is Xontech and Space Vector Corporation. The first demonstration is planned for January 1997. A possible second launch will support a Pacific TMD exercise in FY97. Follow-on acquisition of short range and long range Alternate Air Ballistic target systems will begin in FY98 to meet a delivery requirement in FY00. The acquisition will be conducted by the executing agent: USA/SSDC/TT&E office with an Air Force sub-agency arrangement.	nand (SSDC), ndo, FL) is being tees Corporation cquisition. The th Patterson AFB, oossible second egin in FY98 to
Project 3352	Page 99 of 120 Pages Exhibit R-2 (PE 0603872C)	1872C)

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RDT&E BUDGET ITEM J	EM JUST	IFICAT	ION SH	EET (R	USTIFICATION SHEET (R-2 Exhibit)	jį (j		DATE Fet	February 1997	76
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NU 060	PE NUMBER AND TITLE 0603872C Joint	TILE oint Thea	PE NUMBER AND TITLE OG03872C Joint Theater Missile Defense	le Defen	i	F. W.	РВОЈЕСТ 3352
B. Program Change Summary (\$ in Thousands)										
Previous President's Budget Current Budget Submit/President's Budget		EX 1996 20,259 23,046	H	FY 1997 22,939 22,842	EY 1998 28,443 27,603	FY 1999 19,359 18,721		Total Cost 91,000 92,212		
Change Summary Explanation: Funding: Funding adjustments made to support higher priority projects	oort higher pr	ority projec	sts							
Schedule: None										
Technical: None										
C. Other Program Funding Summary (\$ in Thousands)	(spues									
2257 PATRIOT, PE 0604865C 2260 THAAD, PE 0603861C 2261 THAAD, PE 0604861C 2263 Navy Area System, PE 0603867C 1266 *Navy Theater-Wide System, PE 0603868C 3360 Test Resources, PE 0603872C D. Schedule Profile P. Schedule Profile 1 HERA supporting TMD-RST 1 HERA Pile Driver Demo Lance support to Navy Lower Tier (Area) Tests	EY 1996 352,547 565,818 0 277,565 200,442 31,139 X X	EY 1997 381,092 341,307 277,508 59,315 304,171 35,507	EY 1998 206,057 2940647 261,480 0 194,898 30,888	EX 1999 101,430 16,778 578,467 0 192,073 30,201 EX 1997 2 3	FY 2000 0 0 603,213 0 191,229 29,942	FY 2001 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	EY 2002 0 0 413,884 0 145,490 30,312 3	EY 2003 0 0 372,674 0 149,444 30,363	To Complete TBD TBD Cont TBD Cont Cont Cont Cont Cont Cont Cont Cont	Total Cost TBD TBD Cont TBD Cont Cont
Project 3352	:	Р	Page 100 of 120 Pages	20 Pages	.		Exhibi	Exhibit R-2 (PE 0603872C)	603872C)	

RDT&E BUDGET ITEM JU	STIF	CATI	ON S	USTIFICATION SHEET (R-2 Exhibit)	(R-2 E	xhibi	\$		<u>o</u>	DATE F.	February 1997	/ 199	
BUDGET ACTIVITY 4 - Demonstration and Validation			B 80	PE NUMBER AND TITLE 0603872C Joint	אס דודנב Joint Theater Missile Defense	Theat	er Mis	sile D	efense			PROJE(3352	PROJECT 3352
FY	9661		$\frac{1}{2}$	FY 1997			FY 1998	398			FY 1999	6	
UEDA munartina THAAD Dem/Vel	က	4 ×	- ×	× 3	4	-	2	ю	4	_	2	3	4
	×												
MENA DIR 2D Dello Willow Dune #1 Willow Dune #2				:××									
Air Drop target Demo STORM/HERA supporting PAC-3 EMD		,	×		×	×	×	×		×	×		
tlight testing HERA supporting THAAD LUT Nawy I ower Tier (Area) target support						×		×					
THAAD EMD target support											×	×	×
Storm supporting PAC-2 HERA MTV Demo				××					>				
HEKA Wake Demo													
Project 3352		Pay	101 as	Page 101 of 120 Pages	S	; ; ;			xhibit F	2-2 (PE	Exhibit R-2 (PE 0603872C)	(SC)	

RD	RDT&E PROGRAM ELEME	GRAM EL		NT/PROJECT	COSTB	REAKD	COST BREAKDOWN (R-3)	3)	DATE	February 1997	700
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	ılidation			PE NUMBER ANI 0603872C	PE NUMBER AND TITLE 0603872C Joint	ס דודוב Joint Theater Missile Defense	lissile Def	1		PROJECT 3352
A. Project Cost Breakdown (S in Thousands)	reakdown (\$ in	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999	6		
FMA Prep/presentation Hardware Development Total	tion nent			6,800 16,246 23,046	- 7	8,500 14,342 22,842	0 27,603 27,603	0 18,721 18,721	0 11 12		
B. Budget Acquisition History and Planning Information (\$\subsection\$ in Thousands)	tion History an	d Planning Inf	ormation (S i	n Thousands)							
Performing Organizations:	izations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations USASSDC USAF NAIC	nt Organizations	æ				17,196 5,800	20,584 2,208	15,553 12,000	6,671	Cont	60,004
Support and Management Organizations	ement Organizat	ions									
Test and Evaluation Organizations NAWC	Organizations			-		50	90	50	20	Cont	200
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	tion History and	d Planning Inf	ermation Con	tinued (S in The	onsands)						
Government Furnished Property:	shed Property:										
Project 3352				Page	Page 102 of 120 Pages	ages		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT8	RDT&E PROGRAM ELEME	RAM EL	EMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3	(E)	DATE Fe	February 1997	197
BUDGET ACTIVITY 4 - Demonstration and Validation	on and Val	idation		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	heater Mi	D TITLE Joint Theater Missile Defense	nse	9	PROJECT 3352
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property	Property	•								
Support and Management Property	ient Property									- 1
Test and Evaluation Property	roperty									
Subtotal Product Development	lopment				22,996	22,792	27,553	18,671		92,012
Subtotal Support and Management Subtotal Test and Evaluation	Management Iuation				50	50	50	50		200
Total Project			,		23,046	22,842	27,603	18,721		92,212
Project 3352			Page	Page 103 of 120 Pages	sağı		Exhi	Exhibit R-3 (PE 0603872C)	0603872C)	

RD	RDT&E BUDGET ITEM J		TIFICA.	rion St	HEET (R	USTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Fet	February 1997	26
BUDGET ACTIVITY 4 - Demonstration and Validation	n and Validation			PE NU 060	PE NUMBER AND TITLE 0603872C Join(PE NUMBER AND TITLE O603872C Joint Theater Missile Defense	ater Miss	ile Defen	se	₽ E	РРОЈЕСТ 3354
COST	COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3359 System Test and Evaluation	aluation	33,568	42,792	40,307	26,444	30,263	32,250	31,590	31,636	Continuing	Continuing
A. Mission Description This project provide for assessment of the located in Project 3: support to the Major chemical/biological intercepts, confirma independent assessmesting; and executic of the development identification and ur required by decision	A. Mission Description and Budget Item Justification This project provides for BMDO planning, oversight, and coordination of integrated Test and Evaluation activities, as well as inter-service Test and Evaluation efforts for assessment of the Family of Systems (FoS). Once the test plans are developed, test resource and target development and support is provided. (Test resources located in Project 3360 include test facilities, ranges and test instrumentation; target development and support is found in Project 3359. The program provides for support to the Major Defense Acquisition Program (MDAP) mandatory Live-Fire Test and Evaluation (LFT&E). This includes estimates of probability of kill of chemical/biological submunitions, creation of models to determine chemical/biological ground effects, confirmation of damage laws from low mass/high-velocity intercepts, confirmation of damage laws from high velocity rods, development of generic lethality targets. Additionally, this project provides the following: independent assessments of the JTMD system; maturity evaluation of technology programs; multiple-fidelity models and simulation to support system development testing; and execution of independent technical reviews, system analyses and performance evaluations which constituted to new or enhanced capabilities; management of the development process, and the decision-making process related to the allocation of resources. The performance evaluation has as its primary goals the identification and understanding of system-level performance drivers and the mitigation of technical risk, and to provide timely answers to critical issues and questions required by decision authorities through an annual Consolidated Evaluation (CER).	ation resight, and cc . Once the tee anges and test ram (MDAP) models to det high velocity maturity eval reviews, sys naking proces el performanc	ordination or the plans are instrument mandatory remine chen rods, develouation of te em analyse s related to e drivers an ated Evalual	of integrated developed, to ation; target Live-Fire Te nical/biologi opment of ge chnology program and perform the allocation of the mitigal	Test and Every and Every ast resource developments and Evalucal ground eneric lethality ograms; mul mance evalun of resourction of technician of technician and technician	the test plans are developed, test resource and target development and support is provided. (Test resources and test plans are developed, test resource and target development and support is provided. (Test resources and test instrumentation; target development and support is found in Project 3354). The program provides for DAP) mandatory Live-Fire Test and Evaluation (LFT&E). This includes estimates of probability of kill of to determine chemical/biological ground effects, confirmation of damage laws from low mass/high-velocity ocity rods, development of generic lethality targets. Additionally, this project provides the following: y evaluation of technology programs; multiple-fidelity models and simulation to support system developmens, system analyses and performance evaluations which control of new or enhanced capabilities; managem process related to the allocation of resources. The performance evaluation has as its primary goals the remance drivers and the mitigation of technical risk, and to provide timely answers to critical issues and quest solidated Evaluation Report (CER).	vities, as we velopment at is found in kE). This in mation of diditionally, models and commance evaluate to transceeval to provide a	Il as inter-se and support if Project 335 cludes estimanage laws this project j simulation to new or enlation has stimely answ	rvice Test ar is provided. 4). The progrates of probfrom low ma provides the to support sy hanced capal as its primariers to critical.	nd Evaluatio (Test resous gram provide ability of kil ass/high-velk following: stem develo bilities; man y goals the I issues and	n efforts ces ss for l of ocity pment agement agement
FY 1996 (\$ in Thousands): - \$18,662 Comp Groun	sands): Completed Build 1 development of the Theater Missile Defense System Exerciser (TMDSE). Integrated PATRIOT, AEGIS, Joint Tactica Ground Station (JTAGS), Shield and Command and Control components into the basic TMDSE architecture. Completed test planning for scheduled FoS System Integration Tests (SITs). Performed a Hardware-in-the Loop (HWIL) test for early interoperability assessment.	opment of the , Shield and C	Theater M Command at	issile Defens nd Control c	e System Ex omponents i	of the Theater Missile Defense System Exerciser (TMDSE). Integrated PATRIOT, AEGIS, Joint Tactical and Command and Control components into the basic TMDSE architecture. Completed test planning for n Tests (SITs). Performed a Hardware-in-the Loon (HWIL) test for early interonerability assessment.	DSE). Integ TMDSE arc	rated PATR thitecture. (IOT, AEGIS Completed te	S, Joint Tact est planning	ical Ior
- \$8,656	Performed post HWIL analysis. Began Build 2 TMDSE development which adds THAAD and TPS-59 (HAWK) Radar to the Build 1 architecture. Supported Build 1 transition to the Joint National Test Facility (JNTF). Performed atmospheric chemical dispersion experiments that allowed validation data to determine post-intercept chemical transport to the ground. Developed prototype intercept-to-ground model Post Engagement Ground Effect Model (PEGEM). Determined biological agent	nalysis. Begaralysis. Begaralysis. Begaralysis. Begaralysis hemical dispersional di	n Build 2 Ti tion to the J rision exper	Began Build 2 TMDSE development which adds T transition to the Joint National Test Facility (JNTF) dispersion experiments that allowed validation dat tercept-to-ground model Post Engagement Ground	opment whi I Test Facilit Illowed valid Engagemen	Began Build 2 TMDSE development which adds THAAD and TPS-59 (HAWK) Radar to the Build 1 transition to the Joint National Test Facility (JNTF). I dispersion experiments that allowed validation data to determine post-intercept chemical transport to the tercept-to-ground model Post Engagement Ground Effect Model (PEGEM). Determined biological agent	AD and TP determine p	S-59 (HAW oost-intercep	K) Radar to ot chemical to etermined by	the Build 1 ransport to t	he int
- \$2,656	Executed consolidated evaluation, morpressure at intercept. Executed consolidated evaluation program. Conducted special studies and technical investigations. Participated in THAAD, PATRIOT and NTWDS Test Readiness Reviews. Conducted assessments of TMDSE testing. Monitored FoS MDAP flight testing and confirmed attainment of test objectives. Participated in SIT planning activities. Developed assessment plans for of FoS activities. Developed TMD consolidated Evaluation Plan.	roy manan valuation prog Reviews. Co	ram. Cond nducted ass nning activ	ucted special essments of tities. Develo	Studies and TMDSE test pped assessn	normalistications are interested. In program. Conducted special studies and technical investigations. Participated in THAAD, PATRIOT. Conducted assessments of TMDSE testing. Monitored FoS MDAP flight testing and confirmed attait. It planning activities. Developed assessment plans for of FoS activities. Developed TMD consolidated.	vestigations. ored FoS MD r of FoS acti	Participate AP flight te vities. Deve	d in THAAI sting and co), PATRIOT nfirmed atta consolidate	and inment of d

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Project 3354

Exhibit R-2 (PE 0603872C)

RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUM	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	PROJECT 3354
- \$2,655 - \$939 - \$33,568	Participated in SIT planning activities by chairing the Data Management and Assessment sul Operational Test Agency activities with regard to TMD operational assessments. Monitored objectives. Provide CER detailing current maturity of TMD Family of Systems architecture. Provided technical support for System Test activities at the Executing Agent. Total	Participated in SIT planning activities by chairing the Data Management and Assessment subgroup of the SIT planning team and by coordinating Operational Test Agency activities with regard to TMD operational assessments. Monitored MDAP flight testing and attainment of test objectives. Provide CER detailing current maturity of TMD Family of Systems architecture. Provided technical support for System Test activities at the Executing Agent. Total	by coordinating of test
FY 1997 (\$ in Thousands): - \$18,210 Exect Comp Comp - \$15,203 Deve	Execute SIT-97. Perform HWIL tests and analysis, and perform Complete Build 2 development of TMDSE to include PATRIOT Control components. Perform test planning for scheduled SITs. Develop generic lethality targets for sled testing of interceptor le consistent documentation source for threat lethality target design	Execute SIT-97. Perform HWIL tests and analysis, and perform-SIT analysis. Integration tests of the Family of System will be performed. Complete Build 2 development of TMDSE to include PATRIOT, AEGIS, JTAGS, Shield, TPS-59 (HAWK) Radar, THAAD and Command and Control components. Perform test planning for scheduled SITs. Develop generic lethality targets for sled testing of interceptor lethality to support development and live fire test and evaluation. Provide a consistent documentation source for threat lethality target designs. Provide lethality data analyses for target response of HTIC and fragmentation	erformed. I Command and Provide a nd fragmentation
- \$2,301	engagements with threat targets to evaluate the effectiveness of JN Ground Effect Model (PEGEM) model for low altitude intercepts. Execute integrated evaluation plan and methodology. Conduct spp Readiness Reviews. Participate in PAC-3 Test Readiness reviews. PAC-3, and NTWDS testing. Conduct operational assessment activities for the TMD FoS. Deve	to evaluate the effectiveness of 1MD interceptors. Initial vertification & validation of the Fost Engagement) model for low altitude intercepts. Ian and methodology. Conduct special studies and technical investigations. Participate in FoS MDAP Test in PAC-3 Test Readiness reviews. Conduct independent assessments of TMDSE testing. Monitor THAAD, activities for the TMD FoS. Develop critical operational issues, measures of effectiveness, and measures of	ingagement IDAP Test or THAAD, measures of
- \$2,300	performance. Develop operational assessment plan for the FoS Co System Integration Test. Manage operational assessment activities for the TMD FoS and MI Provide updated Comprehensive Evaluation Report (CER) utilizing well as analytical techniques to estimate the TMD system maturity	performance. Develop operational assessment plan for the FoS Command and Control architecture. Perform operational assessment of the FoS System Integration Test. Manage operational assessment activities for the TMD FoS and MDAPs. Continue monitoring of THAAD, PAC-3, and NTWDS testing. Provide updated Comprehensive Evaluation Report (CER) utilizing current test data from MDAPs, SITs, CINC Assessments, and Wargames, as well as analytical techniques to estimate the TMD system maturity.	nent of the FoS S testing. d Wargames, as
- \$1278 - \$42,792	Provided technical support for System Test activities at the Executing Agent. Total	cuting Agent.	
FY 1998 (\$ in Thousands): - \$19,077 Trans HWII tests tests	Isands): Transition TMDSE Build 2 to the Joint National Test Facility. HWIL, multiple AEGIS ships and Patriot elements, and increas tests and analysis in conjunction with the schedule. Plan SIT 98 Family of Systems will be performed.	nds): Transition TMDSE Build 2 to the Joint National Test Facility. Begin Build 3 development of TMDSE which adds THAAD radar Testbed HWIL, multiple AEGIS ships and Patriot elements, and increased fidelity of BMC³. Perform test planning for scheduled SITs. Perform HWIL tests and analysis in conjunction with the schedule. Plan SIT 98 and plan post SIT analysis. Integration and interoperability testing of the TMD Family of Systems will be performed.	rr Testbed Perform HWIL ing of the TMD
Project 3354	Page 105 of 120 Pages	20 Pages Exhibit R-2 (PE 0603872C)	372C)

		RDT&E BUDGET ITEM JUSTIFICATION	JUSTIFICATION SHEET (R-2 Exhibit)	E Fabrican, 1007
BUDGET ACTIVITY	CTIVITY		PE NUMBER AND TITI F	i ebidaiy 1997
4 - Den	nonstratio	4 - Demonstration and Validation	0603872C Joint Theater Missile Defense	3354
ı	\$13,492	Maintain endgame Parametric Endo-Exo Lethality Simulation (PEELS) and postgame (PEG knowledge of lethality phenomena. Provide realistic model based on test data and analyses fevaporation of Chemical, Biological Weapon (CBW) agents released from ground level to high function of mass and velocity, high velocity phenomena, agent response, and ground effects	Maintain endgame Parametric Endo-Exo Lethality Simulation (PEELS) and postgame (PEGEM) model simulations at current state of knowledge of lethality phenomena. Provide realistic model based on test data and analyses for atmospheric transport, diffusion, deposition, and evaporation of Chemical, Biological Weapon (CBW) agents released from ground level to high altitude. Provide plans to examine lethality as a function of mass and velocity, high velocity phenomena, agent response, and ground effects.	at current state of rt, diffusion, deposition, and ans to examine lethality as a
1	\$ 2,445	Maintain support to execute the Consolidated Evaluation P Participate in THAAD, PAC-3, and NTWDS Test Readine (BMDARC) prior to Part 1 MS III. Participate in SM-2 B the Navy Area TBMD UOES. Assess results of HWILT 99 (PPQT).	Maintain support to execute the Consolidated Evaluation Program and methodology and conduct special studies and technical investigations. Participate in THAAD, PAC-3, and NTWDS Test Readiness Reviews. Provide evaluation support to the BMD Acquisition Review Council (BMDARC) prior to Participate in SM-2 Blk IVA Flight Test Readiness Reviews. Provide evaluation support to BMDARC for the Navy Area TBMD UOES. Assess results of HWILT 98 events and TMDSE testing. Monitor THAAD Pre-Production Qualification test (PPQT).	I technical investigations. uisition Review Council on support to BMDARC for uction Qualification test
ı	\$2,445	Manage operational assessment activities for the TMD FoS Area testing. Provide updated CER utilizing current test detechniques to estimate the TMD system maturity.	Manage operational assessment activities for the TMD FoS. Continue monitoring of THAAD testing. Monitor PAC-3 EMD testing and Navy Area testing. Provide updated CER utilizing current test data from MDAPs, SITs, CINC Assessments, and Wargames, as well as analytical techniques to estimate the TMD system maturity.	5-3 EMD testing and Navy es, as well as analytical
1 1	\$848 \$40,307	Provide technical support for System Test activities at Executing Agent Total	cuting Agent	
EY I	FY 1999 (\$ in Thousands): - \$8,475 Exect	sands): Execute SIT-99. Complete TMDSE Build 3 transition to the	nds): Execute SIT-99. Complete TMDSE Build 3 transition to the Joint National Test Facility. Additional integration and interonerability testing of	interonerability tecting of
ı	\$11,981	the TMD FoS will be conducted. Plan and perform HWIL Maintain endgame (PEELS) and post engagement (PEGEN realistic model based on test data and analyses for atmosph from ground level to high altitude. Provide plans to examin	the TMD FoS will be conducted. Plan and perform HWIL test 99. Perform Post SIT and HWIL test analysis. Maintain endgame (PEELS) and post engagement (PEGEM) model simulations at current state of knowledge of lethality phenomena. Provide realistic model based on test data and analyses for atmospheric transport, diffusion, and deposition and evaporation of CBW agents released from ground level to high altitude. Provide plans to examine lethality as a function of mass and velocity, high-velocity, then many agents.	ality phenomena. Provide of CBW agents released
ı	\$2,571	Execute Consolidated Evaluation Program and methodolog Readiness Reviews. Provide evaluation support to the BMI SM-2 Blk IVA Flight Test Readiness Reviews. Provide evaluation support TMDSF Fox HWII faciling	response, and ground effects. Execute Consolidated Evaluation Program and methodology. Conduct special studies and technical investigations. Participate in PAC-3 Test Readiness Reviews. Provide evaluation support to the BMD Acquisition Review Council (BMDARC) prior to PAC-3 MS III. Participate in SM-2 Blk IVA Flight Test Readiness Reviews. Provide evaluation support to BMDARC for the Navy Area TBMD UOES. Assess results of	Participate in PAC-3 Test -3 MS III. Participate in UOES. Assess results of
1	\$2,571	Manage operational assessment activities for the TMD syste Navy Area testing. Provide updated CER utilizing current tanalytical techniques to estimate the TMD system maturity.	Manage operational assessment activities for the TMD system. Continue monitoring of THAAD testing. Monitor PAC-3 EMD testing and Navy Area testing. Provide updated CER utilizing current test data from MDAPS and SITs, CINC Assessments, and Wargames as well as analytical techniques to estimate the TMD system maturity.	AC-3 EMD testing and I Wargames as well as
1 1	\$846 \$26,444	Provide technical support for System Test activities at Executing Agent Total	cuting Agent	
Acqui	isition Strategy iser (TMDSE)	Acquisition Strategy: This effort will use Service executing agents through existing contracts to construct a TMD Family of Systems HWIL capability, TMD System Exerciser (TMDSE) and conduct TMD system level live flight testing. The strategy provides for lethality sled testing managed by BMDO and executed by Service labs	ng contracts to construct a TMD Family of Systems HWIL 28y provides for lethality sled testing managed by BMDO 3	L capability, TMD System and executed by Service labs
Project 3354	54	Page 106	Page 106 of 120 Pages Exhibit R-2	Exhibit R-2 (PE 0603872C)

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RDT&E BUDGET ITEM JUSTIFIC	CATION	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhib	it)	DATE February 1997	1997
BUDGET ACTIVITY 4 - Demonstration and Validation	<u>a</u> O	PE NUMBER AND TITLE 0603872C Joint	ग्गट oint Theat	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ense	PROJECT 3354
against TMD targets. It also provides Service and BMDO system evaluation funding. The evaluation process is an iterative process which should begin early in the development of the system. Critical system characteristics and issues should be identified early in the process and be evaluated to allow for informed decision-making. Family of System evaluations and assessments will be performed by Service OTAs and JHU/APL.	evaluation fur Critical syste	nding. The evalu in characteristics isments will be pe	ation process and issues sh erformed by S	is an iterative proce ould be identified e ervice OTAs and Jl	ss which should begin carly in the process and be HU/APL.	arly in the c cvaluated
B. Program Change Summary (\$ in Thousands)						
FY Previous President's Budget 3 Current Budget Submit/President's Budget	EY 1996 35,117 33,568	EX 1997 43,421 42,792	EX 1998 42,789 40,307	EY 1999 27,741 26,444	Total <u>Cost</u> 149,068 143,111	
Change Summary Explanation: Funding: Funding transferred to higher priority projects.						
Schedule: Changing funding priorities in FY1996 resulted in a TMDSE hardware-in-the-loop Build 2 slip of approximately 6 months. Beginning development of Build 3 slips to FY1998. Completion of Build 3 to FY99.	TMDSE hard	lware-in-the-loop	Build 2 slip	of approximately 6	months. Beginning dev	elopment of
Technical: None	,					
C. Other Program Funding Summary (S in Thousands)						
EY 1996 FY 1997	997 FY 1998	98 FY 1999	EY 2000	FY 2001 FY 2002	EY 2003 Cor	To Total npl <u>Cost</u>
D. Schedule Profile						
EX 1996 1 2 3 4 TMDSE Build 1 X	4 1	FY 1997 2 3	4	FY 1998 2 3	FY 1999	4
HWIL SIT JT&E TWDSF Build 2	×	× ×	×			
Project 3354	Page 107	Page 107 of 120 Pages		Exh	Exhibit R-2 (PE 0603872C)	

RDT&E BUDGET ITEM JUSTIFICA	USTIFICATION SHEET (R-2 Exhibit)	oit) DATE	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ter Missile Defense	PROJECT 3354
SM2 Blk IVA HWIL THAAD PPQT JT&E SIT HWIL HWIL	1 2 3 4 1 X	EY 1998 2 3 4 1 X X X X	FY 1999 X X X
Project 3354	Page 108 of 120 Pages	Exhibit R-2 (Exhibit R-2 (PE 0603872C)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	30GF	ZAM ELI	EMENT/F	PROJECT	COSTE	REAKD(OWN (R-	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	d Valid	lation			PE NUMBE 060387	PE NUMBER AND TITLE 0603872C Joint	Theater M	PE NUMBER AND TITLE O603872C Joint Theater Missile Defense	ense	9. S.	PROJECT 3354
A. Project Cost Breakdown (\$ in Thousands)	(\$ in Th	ousands)									
				FY 1996		FY 1997	FY 1998	FY 1999			•
Family of Systems Test and Evaluation Total	valuatio	r		33,568 33,568		42,792 42,792	40,307	26,444 26,444			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ry and 1	Janning Inf	ormation (S i	in Thousands)							
Performing Organizations:											-1
Contractor or Contract Government Method/Type Performing or Funding Activity Vehicle		Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations TMDSE	zations			,		12,689	10,072	10,189	2,418	Cont	35,368
Support and Management Organizations SRS Tech CPFF 1 J	anizatio 1	<u>ns</u> 1 June 94				3,402	3,200	3,500	3,500	Cont	13,602
Test and Evaluation Organizations BMDO AFOTEC OPTEC OPTEVFOR	tions					15,927 200 750 300 300	26,920 200 1500 300 600	24,018 200 300 1500 600	18,676 200 300 750 600	Cont Cont Cont Cont	85,541 800 2,850 2,850 2,100
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	ry and	Planning Inf	ormation Co	ntinued (S in T	(ponsands)						
Government Furnished Property:	perty:										
Project 3354				Pag	Page 109 of 120 Pages	Pages		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT	RE PROG	RAM ELI	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3	•	DATE Fe	February 1997	26
BUDGET ACTIVITY 4 - Demonstration and Validation	ion and Val	idation		PE NUMBER AND TITLE 0603872C Joint	AND TITLE C Joint T	D TITLE Joint Theater Missile Defense	ssile Defe		- e	PROJECT 3354
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property	nt Property									
Support and Management Property	ment Property									
Test and Evaluation Property	Property									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	velopment I Management aluation				12,689 3,402 17,477	10,072 3,200 29,520	10,189 3,500 26,618	2,418 3,500 20,526		35,368 13,602 94,141
Total Project					33,568	42,792	40,307	26,444		143,111
			-							
Project 3354			Pag	Page 110 of 120 Pages	ıges		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

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RDT&E BUDGET ITEM		TIFICA	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ritle oint Thea	ater Miss	ile Defen	ıse	E W	РRОЈЕСТ 3359
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3360 Test Resources	31,139	35,507	30,888	30,201	29,942	29,793	30,312	30,363	30,363 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

service test and evaluation efforts, and provides infrastructure for common ground test facilities, ranges and instrumentation. Project 3360 funds the common TMD test This project provides for BMDO planning, oversight and coordination of integrated test and evaluation facilities. The project includes inter-element as well as interinfrastructure costs including BMDO use. Individual programs pay only the direct costs associated with their specific testing efforts.

The mission common ground test facilities include:

Kinetic Kill Vehicle Hardware-in-the-Loop Simulator (KHILS) at Eglin AFB, FL

Aero-Optic Evaluation Center (AOEC) located at Calspan Corp, Buffalo, NY

Hypervelocity Wind Tunnel Number 9 (Tunnel 9) at the Naval Surface Warfare Center, White Oak, MD

National Hover Test Facility (NHTF) at Edwards AFB, CA

Army Missile Optical Range (AMOR) at the U.S. Army Missile Command, Redstone Arsenal, AL

Infrared and Blackbody Standards at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD.

Hypervelocity Ballistic Range G Light Gas Gun at the Arnold Engineering and Development Center (AEDC) in Tullahoma, TN

Captive Carry Capability at the Nevada Test Site

7V and 10V Space Chambers at the Arnold Engineering Development Center, Tullahoma, TN

Portable Optical Sensor Tester (POST) and the Characterization of Low Background Mosaics (CALM) at Rockwell International, Anaheim, CA

Naval Research and Development (NRaD) facility IR Devices Branch located at the Naval Command, Control and Occan Surveillance Center, San Diego,

The Center for Research Support (CERES) at the Joint National Test Facility, Falcon AFB, CO

The mission common range facilities include national ranges such as:

White Sands Missile Range (WSMR) located in Las Cruces, NM

Kwajalein Missile Range (KMR) and the Wake Island Complex located in the South Ocean

Pacific Missile Range Facility (PMRF) located at Kauai, HI

Gulf Test Range (GTR) located at Eglin AFB, Fort Walton Beach, FL.

The range instrumentation special test equipment, data collection assets, and range instrumentation include:

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Exhibit R-2 (PE 0603872C)

RDT&E BUDGET ITEM JUSTIFIC	USTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	
High Altitude Observatory (HALO) with the Infrared Imaging System (IRIS) sensor, based at Aeromet, Inc., Tulsa, OK Sea-Lite Beam Director (SLBD), based at White Sands Missile Range, Las Cruces, NM High Altitude Optical Imaging System (HAOIS), based at White Sands Missile Range, Las Cruces, NM. Mobile Range Safety System and Kwajalcin Range Safety Control System Upgrades NP-3 Aircraft upgrade for remote area safety support. Miscellaneous improvements to BMDO infrastructures and support systems	ed Imaging System (IRIS) sensor, based at Aeromet, Inc., Tulsa, OK ands Missile Range, Las Cruces, NM ased at White Sands Missile Range, Las Cruces, NM. Safety Control System Upgrades art.	
These ground test, range and instrumentation assets provide valuable risk reduction and test implementation capability in support of the TMD test and evaluation. The ground test facilities provide a cost effective method of testing and evaluating applicable component, sub-system and system level technologies. The common range facilities provide a cost effective method of flight testing missile and target components applicable to the TMD program and FoS, BMC³ and interoperability testing. The range instrumentation provides a cost effective capability to collect target signature characteristics, phenomenology data, and target/interceptor diagnostics on flight tests. These facilities and capabilities support systems design, verification and validation of target realism, and the evaluation of test results.	e risk reduction and test implementation capability in support of twaluating applicable component, sub-system and system level tect target components applicable to the TMD program and FoS, BM lect target signature characteristics, phenomenology data, and tary verification and validation of target realism, and the evaluation or	he TMD test and evaluation. The shoologies. The common range tC^3 and interoperability testing. get/interceptor diagnostics on it test results.
FY 1996 (* in Thousands): Provided ground test facility infrastructure and upgrades for BMDO testing loop testing of integrated IR sensor systems at KHILS, wind tunnel testing loop testing of integrated IR sensor systems at KHILS, wind tunnel testing NRaD, and AEDC 7V/10V, propellant loading expertise in support of THA of a light gas gun capability for Lethality testing at AEDC Range G, IR pht primary IR standards, and black body and optical materials calibrations at and conducted SHARRP and THAAD HWIL testing at KHILS. Demonstr. DemVal window stress tests at Tunnel 9. Performed AIT aero-optic/seeken AOEC. Installed a new spectral calibration chamber and conducted THAA— Provided test range infrastructure, upgrades including provision of caretake TMD launch sites and range facilities at WSMR and Wake Island, and asso Provided range instrumentation, upgrades, data collection, and analyses for Kwajalein Missile Range Safety System (KMRSS) at KMR, IOC of P-3 Ra WSMR and HALO/IRIS sensor. - \$11,139 Provided technical support for Resources activities at the Executing Agent. Total	Provided ground test facility infrastructure and upgrades for BMDO testing including: digital emulation at KDEC, end game hardware-in-the-loop testing of integrated IR sensor systems at KHILS, wind tunnel testing at Tunnel 9 in support of THAAD, sensor testing at CALM, POST, NRaD, and AEDC 7V/10V, propellant loading expertise in support of THAAD and hover test capability from the NHTF, complete development of a light gas gun capability for Lethality testing at AEDC Range G, IR phenomenology characterization at Tunnel 9, AMOR and KHILS, and primary IR standards, and black body and optical materials calibrations at the NIST. Completed full operational capability of the WISP system, and conducted SHARRP and THAAD HWIL testing at KHILS. Demonstrated real-time data capability link at CERES. Conducted THAAD bundow stress tests at Tunnel 9. Performed AIT aero-optic/seeker tests and Navy Lower Tier (Area) system aero-optic testing at AOEC. Installed a new spectral calibration chamber and conducted THAAD window emissivity tests at NIST. Provided test range infrastructure, upgrades including provision of caretaker activities at Wake Island, wSMR/Ft Wingate and development of TMD launch sites and range facilities at WSMR and Wake Island, and associated range instrumentation, upgrades, data collection, and analyses for BMDO testing including: Full Operational Capability (FOC) of Kwajalein Missile Range Safety System (KMRSS) at KMR, IOC of P-3 Range Safety System, and data collecting and processing by SLBD at Worlded technical support for Resources activities at the Executing Agent. Total	C, end game hardware-in-the- ensor testing at CALM, POST, the NHTF, complete development and 9, AMOR and KHILS, and al capability of the WISP system, CERES. Conducted THAAD ystem aero-optic testing at ft Wingate and development of rational Capability (FOC) of ting and processing by SLBD at
Project 3359	Page 112 of 120 Pages Exhibi	Exhibit R-2 (PE 0603872C)

RD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 4 - Demonstration and Valida‱	PE NUMBER AND TITLE O603872C Joint Theater Missile Defense	
EY 1997 (\$ in Thousands) - \$13,944 Prov sensor testin NHT stand characteristics orbite - \$12,076 Prov laume of a 1 - \$9,195 Prov WSN and H - \$35,507 Total	Provide ground test facility infrastructure and upgrades for BMDO testing including: end game hardware-in-the-loop testing of integrated IR sensor systems at KHILS, wind tunnel testing at Tunnel 9 to support THAAD and Navy Sea-Based TBMD programs, EKV and SMTS sensor testing at CALM, POST and NRAD, EKV sensor testing at AEDC TV/10V, propellant loading expertise and EKV hover test capability from the NHTF, Patriot and Navy lethality testing at AEDC Range G, IR phenomenology characterization at Tunnel 9, AMOR and KHILS; primary IR standards and black body optical materials calibrations at the NIST. Provide LBIR spectral broadband calibration and THAAD window characterization at NIST. Perform THAAD HWIL testing at KHILS. Conduct AIT and Navy Area seeker aero-optic tests at AOEC. Provide orbital experiment and satellite operations support at CERES. Provide test range infrastructure including caretaker activities at Wake Island and WSMR/Ft Wingate, upgrades, and development of TMD launch and range facilities, and associated range instrumentation sites, includes environmental shelter for Wake Island. Continue development of a range standard for intercept debris analysis. Provide range instrumentation, upgrades, data collection, and analyses for BMDO testing including; data collecting and processing by SLBD at WSMR and HALO/IRIS sensor. Achieve FOC of HAOIS at WSMR and P3 Remote Area Safety Aircraft (RASA). Support upgraded KMR Sange Safety System to support Multiple Shot Engagements. Support System Integration tests (SIT 97). Provide technical support for Resource activities at the Executing Agent.	are-in-the-loop testing of integrated IR MD programs, EKV and SMTS sensor se and EKV hover test capability from the mnel 9, AMOR and KHILS; primary IR calibration and THAAD window eker aero-optic tests at AOEC. Provide upgrades, and development of TMD for Wake Island. Continue development at a collecting and processing by SLBD at raft (RASA). Support upgraded KMRSS sits (SIT 97).
EY 1998 (\$ in Thousands): - \$14,036 Provi senso and A AED0 mater exper exper - \$9,113 Provi testin PMRI - \$7,456 Provi HAO) NP-3 - \$283 Provi - \$30,888 Total	Provide ground test facility infrastructure and upgrades for BMDO testing including: end game hardware-in-the-loop testing of integrated IR sensor systems including THAAD and Navy at KHILS, wind tunnel testing at Tunnel 9 to support AIT, sensor testing at CALM, POST, NRaD, and AEDC 7V/10V, propellant loading expertise and GBI hover test support from the NHTF, THAAD and Navy TBMD lethality testing at AEDC Range G. IR phenomenology characterization at Tunnel 9, AMOR and KHILS, and primary IR standards, and black body and optical materials calibrations at the NIST. Support THAAD flight test anomaly investigation and objective window testing at Tunnel 9. Provide orbital experiment and satellite operations support at CERES Provide test range infrastructure including provision caretaker activities at Wake Island, WSMR and Ft Wingate, and upgrades for BMDO testing including development of TMD launch and range facilities, and associated range instrumentation sites, including new development at PMRF and second environmental shelter at Wake Island. Provide range instrumentation, upgrades, data collection, and analyses for BMDO testing including: data collecting and processing by SLBD, HAOI at WSMR and HALO/IRIS sensor. Support FOC of upgraded KMRSS to support Multiple Shot Engagements. Achieve FOC of second Provide technical support for Resources activities at the Executing Agent. Total	are-in-the-loop testing of integrated IR, sensor testing at CALM, POST, NRaD, and Navy TBMD lethality testing at a standards, and black body and optical indow testing at Tunnel 9. Provide orbital twingate, and upgrades for BMDO on sites, including new development at at at collecting and processing by SLBD, t Engagements. Achieve FOC of second
Project 3359	Page 113 of 120 Pages	Exhibit R-2 (PE 0603872C)

RDT&E BUDGET ITEM JUS	USTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhib	it)	DATE Februs	February 1997
BUDGET ACTIVITY 4 - Demonstration and Validation		PE NUMBER AND TITLE 0603872C Join!	ס דודנב Joint Theat	PE NUMBER AND TITLE OG03872C Joint Theater Missile Defense	efense	PROJECT 3359
FY 1999 (\$ in Thousands): - \$13,735 Provide ground test facility infrastructure and upgrades for BMDO testing including: end game hardware-in-the-loop testing of integrated IR sensor systems at KHILS, wind tunnel testing at Tunnel 9 to support AIT, sensor testing at CALM, POST, NRaD, and AEDC 7V/10V, propellant loading expertise and hover test capability from the NHTF, lethality testing at CALM, POST, NRaD, and AEDC 7V/10V, propellant loading expertise and hover test capability from the NHTF, lethality testing at CALM, POST, Rabbort THAAD flight test anomaly investigation and objective window testing at Tunnel 9. Provide orbital experiment and satellite operations support at CERES. - \$9,139 Provide test range infrastructure including caretaker activities at Wake Island, WSMR and Ft Wingate, and upgrades for BMDO testing including development of TMD launch and range facilities, and associated range instrumentation sites, including mew development at PMRF. - \$7,044 Provide range instrumentation, upgrades, data collection, and analyses for BMDO testing including: data collecting and processing by SLBD, HAOI at WSMR and HALO/IRIS sensor. Support SIT 99. - \$283 Provide technical support for Resource activities at Executing Agent. - \$30,201 Total	cture and upgrades el testing at Tunnel er test capability from test sandards, black window testing at Juding caretaker actich and range facilitates, data collection nsor. Support SIT ce activities at Exercitates.	for BMDO testing to support AI. 9 to support AI. 5 to support AI. 6 body and optical 6 funnel 9. Provic 7 ivities at Wake II. 7 is and analyses for 99. cuting Agent.	g including: end f, sensor testing at thality testing at I materials, calible te orbital experin sland, WSMR an ed range instrum or BMDO testing	d game hardware at CALM, POST, AEDC Range G, ations at the NIS nent and satellite d Ft Wingate, an entation sites, including: data	structure and upgrades for BMDO testing including: end game hardware-in-the-loop testing of integrated IR tunnel testing at Tunnel 9 to support AIT, sensor testing at CALM, POST, NRaD, and AEDC 7V/10V, hover test capability from the NHTF, lethality testing at AEDC Range G, IR phenomenology characterization ary IR standards, black body and optical materials, calibrations at the NIST. Support THAAD flight test tive window testing at Tunnel 9. Provide orbital experiment and satellite operations support at CERES. including caretaker activities at Wake Island, WSMR and Ft Wingate, and upgrades for BMDO testing launch and range facilities, and associated range instrumentation sites, including new development at PMRF. spensor. Support SIT 99. S sensor. Support SIT 99.	integrated IR V/10V, sharacterization flight test CERES. I testing tent at PMRF. ing by SLBD,
Acquisition Strategy: In using ranges and test facilities, BMDO implements a Reliance process which: a) maintains perspective of national technical test capabilities; b) responds to program requirements; c) uses existing test resources where possible; d) requires coordination prior to development of new resources; and e) responds to program requirements; c) uses existing test resources where possible and practicable. This policy results in a variety of acquisition methods. Executing Agent Project Managers for the elements and tasks under this project include the three military services and the BMDO. Service Project Manager organizations specifically include: the U.S. Army Space and Strategic Defense Command (USASSDC); the U.S. Navy Office of Naval Research; Navy Ballistic Missile Defense Technology; and the U.S. Air Force Phillips Laboratory. The majority of the ground test facilities are government owned and operated, with some degree of contractor support, which support multiple BMDO users. The test ranges are part of the DoD Major Range and Test Facility Base (MRTFB). The HALO/IRIS sensor are operated by competitively awarded contracts. The ROBS laser radar is undergoing analysis for future application. SLBD is operated by the U.S. Army (government and contractor personnel). Data from SLBD is collected and processed by FFRDC personnel.	MDO implements a resources where posible and practicable ude the three milits SASSDC); the U.S. ound test facilities I the DoD Major Raindergoing analys y FFRDC personne	1 Reliance proces ssible; d) require e. This policy re ary services and Navy Office of are government ange and Test Fais for future app 1.	ss which: a) mass coordination p sults in a variety the BMDO. Ser Naval Research; owned and operacility Base (MR? lication. SLBD i	intains perspective rior to developmon of acquisition myice Project Mani Navy Ballistic Mated, with some de IFB). The HALC is operated by the	s, BMDO implements a Reliance process which: a) maintains perspective of national technical test capability test resources where possible; d) requires coordination prior to development of new resources; and e) possible and practicable. This policy results in a variety of acquisition methods. Executing Agent Project include the three military services and the BMDO. Service Project Manager organizations specifically inclust (USASSDC); the U.S. Navy Office of Naval Research; Navy Ballistic Missile Defense Technology; and the reground test facilities are government owned and operated, with some degree of contractor support, which art of the DoD Major Range and Test Facility Base (MRTFB). The HALO/IRIS sensor are operated by lar is undergoing analysis for future application. SLBD is operated by the U.S. Army (government and contrated by FFRDC personnel.	I test capabilities; and e) sent Project cifically include: ology; and the pport, which rated by rent and contractor
B. Program Change Summary (S in Thousands)	•				£	
Previous President's Budget Current Budget Setemit/President's Budget	EX 1996 30,162 31,139	FY 1997 33,322 35,507	FY 1998 33,082 30,888	FY 1999 32,546 30,201	Lotal Cost 129,112 127,735	
Change Summary Explanation: Funding: None Schedule: None						
Project 3359	Page	Page 114 of 120 Pages	S		Exhibit R-2 (PE 0603872C)	3872C)

 $\begin{array}{cc} \text{unclassified} & 246 \\ \end{array}$

								DATE		
RDT&E BUDGET ITEM		TIFICA	JUSTIFICATION SHEET (R-2 Exhibit)	IEET (R	-2 Exhil	oit)			February 1997	997
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NU 0 90	PE NUMBER AND TITLE 0603872C Joint	ITLE oint Thea	DITILE Joint Theater Missile Defense	ile Defen	se		РРОЈЕСТ 3359
Technical: None										
C. Other Program Funding Summary (S in Thousand	(spuesno									
									To	Total
	FY 1996	FY 1997	FY 1998	FY 1999	EY 2000	FY 2001	FY 2002	FY 2003	Compl	Cost
1155 Phenomenology Program, PE 0603872C	36,908	31,338	37,835	38,622	34,464	37,300	37,205	36,490	Cont	Cont
1266 Navy Theater-wide TBMD, PE 0603868C	200,442	304,171	194,898	192,073	191,229	190,930	145,190	149,444	Cont	Cont
2400 NMD Program, PE 0603871C	730,656	828,864	504,091	393,085	309,748	309,584	391,858	392,433	Cont	Cout
1270 Advanced Interceptors, PE 0603173C	26,788	68,409	31,492	29,412	42,890	46,133	49,460	42,449	Cont	Cont
2257 PATRIOT, PE 0604865C	352,547	381,092	206,057	101,430	0	0	o (•	CRI	CEL
2259 Israeli Cooperative Projects, PE 0603872C	59,352	43,892	38,715	38,662	38,624	38,591	0	0 (OSI CEL	TBD
2260 THAAD System, PE 0603861C	565,818	341,307	294,647	16,778	0	0	0	0	IBD J	IBD
2260 THAAD System, PE 0604861C	0	277,508	261,480	578,467	603,213	584,561	413,884	372,674	Cont	Cont
2263 Navy Area TBMD, PE 0604867C	0	241,330	267,822	226,748	222,145	158,271	52,433	38,089	Cont	Cont
3157 Environmental Siting & Fac, PE 0603872C	4,369	5,972	3,600	3,640	3,631	3,609	3,606	3,612	Cont	Cont
3354 Targets, PE 0603872C	23,046	22,842	27,603	18,721	42,755	42,226	42,463	42,578	Cont	Cont
3359 System Test and Evaluation, PE 0603872C	33,568	42,792	, 40,307	26,444	30,263	32,250	31,590	31,636	Cont	Cont
D. Schedule Profile										
	FV 1996		Ţ	FV 1997		FY 1998	×		FY 1999	
	2 3	4	1 2	3	4	2	3 6	_	2 3	4
KDEC Support to THAAD X										
AMOR KHILS Support X										
				;	;					
ng at AMOR				< >	< >					
AIT tests at AOEC	< > < >	< >	< > < >	< >	< < >					
lests				< >		>				>
				<;	< ;	<;	<;	<;	< ;	<;
				×		×				×
Navy Area TBMD tests at AOEC			×	×						
KMRSS IOC	×									
KMR TCMP Launch	×		×							
Project 3359			Page 115 of 120 Pages	120 Pages			Exhibi	Exhibit R-2 (PE 0603872C)	503872C	

RDT&E BUDGET ITEM JUSTIFICATION SHEET	門	N JUS	TEC	ATIC	N SH		(R-2 Exhibit)	xhib	€			DATE	February 1997	IV 19	16
BUDGET ACTIVITY 4 - Demonstration and Validation					PE NU	PE NUMBER AND TITLE	D TITLE) TITLE Joint Thostor Missilo	or Mis		Defense	ĺ		,	PROJECT
		FY 1996				FV 1997	- 1		<u>}</u>			١	7.	990	600
			4	_	1 ~	3	4	-	,	7"	4	-		7 ~	_
AEDC Range G FOC		· ×	•	•	×	· ×	· ×	· ×	×	×	· ×	· ×	۱ ×	۰ ×	r >
HALO/IRIS KMR Data Coll		×			:	ł	1	:	(;	:	(:		<
WSMR Navy SM2-Blk IV Testing		×													
Tunnel 9 Phenomenology Support		×	×				×				×				
THAAD Dem/Val window stress tests at		×		×	×										
THAAD FMD wind tunnel testing at									>	>	>		>	>	;
Tunnel 9									<	<	<		<	<	<
Lethality testing at AEDC Range G		×		×	×	×	×	×	×	×	×				
NIST Spectral IR Primary Standard IOC			×			<u> </u>	!	:	;	;	;				
HAOIS IOC							×								
KHILS WISP FOC		2	×												
NIST THAAD Window Characterization	•	×	×	×	×										
NIST 7V Black Body Calibration			×												
10V Chamber IOC			×												
KHILS HWIL for THAAD			×	×	×	×	×	×	×	×	×	×	×	×	×
KMR Willow Dune Launch					×										
SIT 97					×										
Navy Shroud Deployment at Tunnel 9						×									
NP-3 RASA IOC					×										
Second NP-3 RASA IOC											×				
PAC-3 WSMR Launch					×	×	×	×	×	×	×	×	×	×	
THAAD LUT								×					×		
			•										×	×	×
AIT @ Tunnel 9										×	×				
AIT @AOEC					×	×			×	×		×	×		
AIT @ Captive Carry								×	×						
CERES FOC			×												
CERES Satellite Operations Support				×	×	×	×	×	×	×	×	×	×	×	×
CERES SM 13 FOS Support								×	×	×	×				
, .															
Droiset 3350				Dane	Daga 116 of 130 Daga	O Dagg					1 1 1	,		Ć	
110,000				1 26	11001	40 1 uge					TXLIIDIL	77 72	EXIIIDII K-Z (PE U0U381ZC	37	

RD.	RDT&E PROGRAM ELEME	GRAM EL	EMENT/	ROJEC	T COS	NT/PROJECT COST BREAKDOWN (R-3)	OWN (R-	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation	tion and Va	lidation			PE NUI 0603	PE NUMBER AND TITLE 0603872C Joint	D TITLE Joint Theater Missile Defense	lissile Defe	ense	3 -	PROJECT 3359
A. Project Cost Breakdown (\$ in Thousands)	eakdown (\$ in	Thousands)									
				FY 1996	996	FY 1997	FY 1998	FY 1999			
Test Facilities Test Ranges Test Resources Total		•		14, 7, 9, 91,	14,198 7,724 9,217 31,139	13,616 12,076 9,815 35,507	14,036 9,113 7,739 30,888	13,735 9,139 7,327 30,201			
B. Budget Acquisition History and Planning Informati	tion History an	d Planning In	formation (\$ i	ion (\$ in Thousands)	ø						
Performing Organizations:	izations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	n Budget 6 FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations	nt Organization	ga									
Support and Management Organizations	ement Organiza	tions									
Test and Evaluation Organizations USASSDC Air Force NSWC White	Organizations					12,681 7,688 3,463	13,386 7,121 3,350	12,722 9,687 0	12,427 9,546 0	Cont Cont	51,216 34,042 6,813
Oak SPAWAR BMDO						1,414 5,893	1,185	1,169	1,150	Cont	4,918 30,746
Project 3359				Pa	Page 117 of 120 Pages	20 Pages		Exh	Exhibit R-3 (PE 0603872C)	0603872C)	

RDT&E PROGRAM ELEMEN	BRAM EL	EMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3		DATE Fe	February 1997	760
BUDGET ACTIVITY 4 - Demonstration and Validation	lidation		PE NUMBER AND TITLE 0603872C Join	AND TITLE C Joint T	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ssile Defe	l		PROJEСТ 3359
B. Budget Acquisition History and Planning Information Continued (S in Thousands)	d Planning Inf	ormation Continued (\$ in Th	ousands)						
Government Furnished Property:									
Contract Method/Type Item or Funding Description Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property									
Support and Management Property									
Test and Evaluation Property									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation				31,139	35,507	30,888	30,201		127,735
Total Project				31,139	35,507	30,888	30,201		127,735
	·								
Project 3359		Page	Page 118 of 120 Pages	ges		Exhi	Exhibit R-3 (PE 0603872C)	0603872C)	

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RDT&E BUDGET ITEM		TIFICA.	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 4 - Demonstration and Validation			PE NI 060	PE NUMBER AND TITLE 0603872C Joint Theater Missile Defense	ritle oint Thea	ater Miss	ile Defen	ıse	± &	РRОЈЕСТ 3360
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
4000 Operational Support	0	82,876	87,516	84,809	88,185	988'68	92,553	92,987	92,987 Continuing Continuing	Continuing

A. Mission Description and Budget Item Justification

This project provides support in three basic areas: personnel and related support costs; funding to meet fluctuation costs and contract terminations; and assistance required to fund support service contracts for the Theater Missile Defense (TMD) program.

Defense, U.S. Navy PEO for Theater Defense, U.S. Air Force PEO office, and the National Test Facility. This project supports funding for overhead/indirect personnel located within the Washington, D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, U.S. Army PEO Missile Personnel and related support costs common to all TMD projects include support of the Office of the Director, Ballistic Missile Defense Organization and his staff costs, benefits, and infrastructure costs such as rents, utilities, supplies, etc.

The BMDO prioritizes funding within this project to meet operational, contractual, and statutory fiscal requirements for the TMD program. Operational requirements programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts. Finally, statutory Accounting Service (DFAS). Contractual requirements include reserves for special termination costs on designated contracts and provisions for terminating other include reimbursable services acquired through the Defense Business Operating Fund (DBOF), such as accounting services provided by the Defense Finance and requirements include funding for charges to canceled appropriations in accordance with Public Law 101-510.

and information management. These efforts include assessment of technical project design, development and testing, test planning, assessment of technology maturity contracts to fully support functions such as ADP operations, automated tool, Access control offices, and graphics support, to supportive efforts required, as well as to supplement the BMDO government personnel. Typical efforts include cost estimating, security management, contracts management, strategic relations management schedule, cost, and performance, with attendant documentation of the many related programmatic issues. The requirement for this area is based on most economical and technology integration across BMDO projects; and support of design reviews and technology interface meetings. Program control tasks include assessment of Assistance required to support BMDO overhead management functions for the TMD program is contained in this project. This assistance ranges from operational and efficient utilization of contractors versus government personnel. The Fiscal Year 1996 Defense Authorization Act eliminated the management program element effective with the Fiscal Year 1997 President's Budget submission. This overhead management and indirect program support funding has been realigned in accordance with Public Law 104-106.

Project 3360

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Exhibit R-2 (PE 0603872C)

RDT&E BUDGET ITEM J	SET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (F	3-2 Exhibi	g	DATE February 1997	266
BUDGET ACTIVITY 4 - Demonstration and Validation	lion	PE NUMBER AND TITLE 0603872C Joint	PE NUMBER AND TITLE O603872C Joint Theater Missile Defense	er Missile D	1	PROJECT 3360
EY 1996 (\$ in Thousands):						
FY 1997 (\$ in Thousands): - \$82,876 Continue provid - \$82,876 Total	<u>unds):</u> Continue providing management and support for overh Total	ead/indirect fixed o	costs such as civ	ilian payroll, tra	and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.	plies.
EY 1998 (\$ in Thousands): - \$87,516 Continue provid - \$87,516 Total	<u>unds):</u> Continue providing management and support for overh Total	ead/indirect fixed o	costs such as civ	ilian payroll, tra	and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.	plies.
FY 1999 (\$ in Thousands): - \$84,809 Continue provid - \$84,809 Total	unds): Continue providing management and support for overh Total	ead/indirect fixed o	costs such as civ	ilian payroll, tra	and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies.	plics.
B. Program Change Summary (\$\int\$ in Thousands)	ousands)					
Previous President's Budget Current Budget Submit/President's Budget	FY 1996 0 0	EY 1997 88,179 82,876	EY 1998 88,928 87,516	EY 1999 85,741 84,809	Total <u>Cost</u> 262,848 255,201	
Change Summary Explanation: Funding: Management costs realig Schedule: None Technical: None	Summary Explanation: Funding: Management costs realigned to technical program elements effective with FY 1997. Schedule: None Technical: None	ctive with FY 1997	7.			
Project 3360	Раде	Page 120 of 120 Pages			Exhibit R-2 (PE 0603872C)	

RDT&E	RDT&E BUDGET ITEM		TIFICA	TION SE	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Fet	February 1997	26
BUDGET ACTIVITY 5 - Engineering and Manufacturing Devel	ınufacturing D	evelopment	ent	PE NI 060 Sys	PE NUMBER AND TITLE 0604861C Thea System - TMD	PE NUMBER AND TITLE 0604861C Theater High-Altitude Area Defense System - TMD	igh-Altitu	ide Area	Defense		РРОЈЕСТ 2260
COST (\$ In Thousands)	usands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2260 Theater High Altitude Area Defense	efense	0	277,508	261,480	578,467	603,213	584,561	413,884	372,674	Continuing	Continuing
A. Mission Description and Budget Item Justification The Theater High Altitude Area Defense (THAAD) System Engineering and Manufacturing Development (EMD) phase will refine and mature the Demonstration/Validation (Dem/Val) system design to ensure component and system performance, producibility, and supportability. The EMD contractor will design, develop, fabricate, integrate, assemble, test, check-out, evaluate, document, deliver, and support the THAAD system.	udget Item Justifica Area Defense (THA. Dem/Val) system de , assemble, test, che	ttion AD) System sign to ensun ck-out, evalu	Engineerin re componer rate, docume	g and Manu it and systen ant, deliver,	facturing De n performan	velopment (ce, producibi the THAAD	EMD) phase ility, and sup system.	e will refine portability.	and mature t The EMD c	the contractor wi	ll design,
FY 1996 (\$ in Thousands): - \$0 N/A - \$0 Total											
FY 1997 (\$0 in Thousands): - \$268,537 Funds - \$5,769 Target - \$1,697 OT&E - \$1,505 Small - \$277,508 Total	sands): Funds are being reprogrammed to Dem/Val to support revised flight test schedule Targets: Funds are being reprogrammed to Dem/Val to support revised flight test schedule OT&E: Funds are being reprogrammed to Dem/Val to support revised flight test schedule Small Business Innovative Research Total	nmed to Den reprogramm eprogramme ? Research	n/Val to sup ed to Dem/\ id to Dem/V	port revised /al to suppor al to suppor	to Dem/Val to support revised flight test schedule grammed to Dem/Val to support revised flight test rammed to Dem/Val to support revised flight test s arch	hedule ght test schec ht test sched	tiule ule				
FY 1998 (\$ in Thousands): - \$258,873 Award (UOEs studies	Award EMD contract. Begin preparation and training for the THAAD Limited User Test (LUT) for the User Operational Evaluation System (UOES). Begin software maintenance. Begin THAAD objective system design. Initiate material purchases for hardware. Continue lethality studies and algorithm development. Continue pursuing integration of THAAD Battle Management/Command, Control, Communications, Computers, Intelligence (BM/C4I) with the Project Manager (PM), Air Defense Command and Control Systems (ADCCS) to take advantage of	gin preparat maintenance elopment. C	ion and train . Begin TH. ontinue purs	ing for the AAD objecti	THAAD Lin ive system dition of THA	uited User Te esign. Initial AD Battle N.	sst (LUT) for te material p fanagement/ and and Con	r the User O urchases for 'Command, '	perational E hardware. (Control, Cor	valuation Sy Continue let mmunication	stem hality is,
previo Softwa - \$2,607 Target - \$261,480 Total	previous Army developments of force operations software. Includes support for ADCCS to establish test requirements and cases for Computer Software Component integration and test. Targets: Continue procurement of targets to support THAAD flight tests. Maintain infrastructure to support TMD targets. Total	ents of force gration and to ement of targ	operations s est. gets to suppo	oftware. In	cludes suppc	force operations software. Includes support for ADCCS to establish test requirements and and test. of targets to support THAAD flight tests. Maintain infrastructure to support TMD targets.	SS to establis	sh test requin	ements and AD targets.	cases for Co	mputer
Project 2260				Page 1 of 5 Pages	5 Pages			Exhibi	Exhibit R-2 (PE 0604861C)	604861C)	

RD	RDT&E BUDGET ITEM JUSTIFICA	USTIFICATION SHEET (R-2 Exhibit)	R-2 Exhibi	t)	DATE February 1997	1997
BUDGET ACTIVITY 5 - Engineering an	вирсет Астіvіту 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604861C Thea System - TMD	id тіт <u>ге</u> Theater Hig ГМD	h-Altitude A	PE NUMBER AND TITLE 0604861C Theater High-Altitude Area Defense System - TMD	PROJECT 2260
EX 1999 (\$ in Thousands): - \$555,200 Begin Rada Rada tests THA - \$16,498 Targ - \$5,375 Lethx - \$1,394 OT& - \$578,467 Total	Begin delivery of EMD hardware (Launcher and Testbeds). Participate in Theater Critical Measurements Program (TCMP)-3 to evaluate the Radar and BM/C4I. Participate in System Integration Test (SIT)-2 exercise to evaluate system interoperability. Conduct the additional UOES tests (AUT). Continue system design engineering, lethality analysis, and algorithm development. Begin ground testing and integration of the THAAD system including UOES Radar. Conduct requirements and design reviews. Targets: Continue procurement of targets to support THAAD flight tests. Maintain infrastructure to support TMD targets. Lethality - Continue lethality simulation code validation, begin design/development of test hardware. Total	I Testbeds). Participate ration Test (SIT)-2 exering, lethality analysis, and retrequirements and desport THAAD flight test lidation, begin design/dAAD system.	in Theater Critic cise to evaluate s; d algorithm devel ign reviews. s. Maintain infra evelopment of te.	al Measurements /stem interoperal opment. Begin s structure to supp st hardware.	s Program (TCMP)-3 to e bility. Conduct the additi ground testing and integra ort TMD targets.	valuate the onal UOES tion of the
Acquisition Strategy The EMD phase contt USD(A&T)) utilizing Production (LRIP) an	Acquisition Strategy The EMD phase contract (missile, launcher, BM/C4I, and Radar) will be a sole source award to the Dem/Val contractor team (As approved September 15, 1995 by USD(A&T)) utilizing the DoD Acquisition Streamlining approach. The contractor team for the EMD phase will become the contractor team for the Low Rate Initial Production (LRIP) and Full Rate Production (FRP) phases. A single prime contractor will have total system performance responsibility for the EMD, LRIP, and FRP.	oe a sole source award t e contractor team for th ime contractor will hav	o the Dem/Val co e EMD phase wil e total system per	ntractor team (A I become the cor formance respor	s approved September 15 itractor team for the Low sibility for the EMD, LR	, 1995 by Rate Initial P, and FRP.
B. Program Change Summary (\$\\$Previous FY 97 President's Budget Ammonitated Value	B. Program Change Summary (\$ in Thousands) FY 1996 Previous FY 97 President's Budget Annonitated Value	96 FY 1997 0 212,798 277 798	EY 1998 481,513	FY 1999 534,820	Total <u>Cost</u> 1,229,131	
Adjustments to Appropriated Value: a. General Reductions (FFRDC FY 98/President's Budget Request	Istments to Appropriated Value: a. General Reductions (FFRDC, Inflation etc.) 8/President's Budget Request	-290 0 277,508	261,480	578,467	1,117,455	
Change Summary Explanation: Funding: A request has be Dem/Val and EMD funds.	Summary Explanation: Funding: A request has been submitted to reprogram FY 97 EMD funds to Dem/Val. This submission reflects the realignment of FY98 and FY99 funds between Dem/Val and EMD funds.	funds to Dem/Val. Thi	s submission refl	ects the realignm	ent of FY98 and FY99 fu	nds between
Schedule: The N failure investigal testing of FTV-0	Schedule: The Milestone II DAB Review milestone has slipped due to longer than expected Flight 6 failure investigation and Flight 7 preparation. The Flight 6 failure investigation caused Flight 7 to move from September to December 1996. An inertial measurement unit software error, found during software verificatic testing of FTV-07, further delayed the flight test to late February 1997.	e to longer than expecte ecember 1996. An iner 997.	rd Flight 6 failure tial measurement	investigation an unit software en	e has slipped due to longer than expected Flight 6 failure investigation and Flight 7 preparation. The Flight 6 September to December 1996. An inertial measurement unit software error, found during software verification late February 1997.	ne Flight 6 ; verification
Project 2260		Page 2 of 5 Pages			Exhibit R-2 (PE 0604861C)	(C)

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RDT&E BUDGET ITEM		TIFICAT	HS NOI.	JUSTIFICATION SHEET (R-2 Exhibit)	2 Exhib	it)		DATE Feb	February 1997	97
BUDGET ACTIVITY 5 - Engineering and Manufacturing Devel	evelopment	ant	PE NUI 0604 Syst	PE NUMBER AND TITLE 0604861C Theater High-Altitude Area Defense System - TMD	⊤∟E neater Hi o	gh-Altitu	de Area	Defense	P 2	PROJECT 2260
Technical: None										
C. Other Program Funding Summary (\$ in Thousands)	(spues								f	i
2260, THAAD Procurement, SSN C494000*2260, THAAD MILCON, PE 0604861C 2260, THAAD Dem/Val, PE 0603861C * IN ARMY TOA	FY 1996 0 13,104 565,818	EY 1997 0 0 341,307	FY 1998 0 4,565 294,647	FY 1999 0 0 16,778	EX 2000 0 0 0	*33,785 0	FY 2002 *531,725 0	FY 2003 *606,315 4,994 0	To Compl *Cont Cont 0	Total Cos *Com Com 1,215,634
D. Schedule Profile										
EMD Contract Award Limited User Test Additional UOES Test	FY 1996 2 3	4	, 1 , 2 E	2 3	4 	EY 1998 2 3 X X	ಷ	1 2 2	EY 1999 2 3 X	4
Project 2260			Page 3 of 5 Pages	Pages			Exhibit	Exhibit R-2 (PE 0604861C)	:04861C)	

X	RDT&E PROGRAM ELEME	RAM EL	EMENT/	NT/PROJECT COST BREAKDOWN (R-3)	COSTE	REAKD	OWN (R-	3)	DATE	February 1997	790
BUDGET ACTIVITY 5 - Engineeri	вироет Астіvіту 5 - Engineering and Manufacturing Development	ufacturing	Developm	ent	PE NUMBE 060486 System	PE NUMBER AND TITLE 0604861C Theat System - TMD	er High-A	PE NUMBER AND TITLE 0604861C Theater High-Altitude Area Defense System - TMD	a Defens		PROJECT 2260
A. Project Cost Breakdown (\$ in Thousands)	Breakdown (\$ in	Thousands)									
				FY 1996		FY 1997	EY 1998	FY 1999			
a. Prime Contract					0 26	268.537	224.173	425,200			
b. Other Government Activities	nent Activities					0	8,100	55,600			
c. Support Contracts	ıcts				0	0	26,600	51,900			
d. Program Management	gement				0	0	0	22,500			-
e. Targets					0	5,769	2,607	16,498			
f. Lethality					0	0	0	5,375			
g. OT&E					0	1,697	0	1,394			
h. Small Business and Innovative Research	s and Innovative R	Lesearch			0	1,505	0				
Total					27	277,508	261,480	578,467			
B. Budget Acquisition History and Planning Information (S in Thousands)	sition History an	d Planning In	formation (S i	n Thousands)							
Performing Organizations:	inizations:										
Contractor or	Contract	A brown A	Dorforming	Droine	Ę						
Performing	or Funding	Obligation	Activity	Office	Prior to	Budget	Budget	Budget	Rudget	Budget to	Total
Activity	Vehicle	Date	EAC	EAC	FY 1996	FY 1996	FY 1997	FY 1998	FY 1999	Complete	Program
Product Development Organizations	nent Organizations	roi.									
LMMS	CPFF/SS	Feb 97			0	0	249,600	224,173	425.200	0	898.973
RAYTHEON	CPIF/CPAF	Feb 97			0	0	18,937	0	0	0	18,937
Support and Management Organizations	gement Organiza	tions									
SETA	C/CPAF	April 98			0	0	0	11,050	22,500		33.550
Other Spt Cont	Varions	Multiple			0	0	0	15,550	29,400		44,950
OGAs	MIPR	Multiple			0	0	0	8,100	53,300		61,400
SBIR					0	0	1,505	0	0		1,505
Test and Evaluation Organizations	n Organizations										
Project 2260				P	Page 4 of 5 Pages	ses		Exhii	oit R-3 (PF	Exhibit R-3 (PF 0604861C)	
									1 2 2 1	12100100	

RDT&E	PROG	RAM EL	EMENT/F	RDT&E PROGRAM ELEMENT/PROJECT	COST BREAKDOWN (R-3)	ZEAKDC	WN (R-	3)	DATE Fe	February 1997	997
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	d Manuf	acturing [)evelopme	ınt	PE NUMBER AND TITLE 0604861C Thea System - TMD	AND TITLE C Theate - TMD	ре NUMBER AND TITLE 0604861C Theater High-Altitude Area Defense System - TMD	titude Are	a Defens		PROJECT 2260
Contractor or Contract Government Method/Ty Performing or Funding Activity Vehicle WSMR/USAKA MIPR OT&E Targets Lethality	ct d⁄Type ding e	Award or Obligation <u>Date</u> April 98	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996 0 0 0	Budget F <u>Y 1996</u> 0 0 0	Budget F <u>Y 1997</u> 0 1,697 5,769	Budget FY 1928 0 0 2,607	Budget EY 1999 24,800 1,394 16,498 5,375	Budget to Complete	Total Program 24,800 3,091 24,874 5,375
B. Budget Acquisition History and Planning Information Continued (S in Thousands)	story and	Planning Inf	ormation Con	tinued (S in Th	(onsands)						
Government Furnished Property: Contract Method/Type Item Or Funding	ned Property: Contract Method/Type or Funding	Award or Obligation <u>Date</u>	Delivery Date	,	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property N/A	erty				0	0	0	0	0	0	
Support and Management Property N/A	Property				0	0	0	0	0	0	
Test and Evaluation Property N/A	≱				0	0	0	0	0	0	
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	nent igement in						268,537 1,505 7,466	224,173 34,700 2,607	425,200 105,200 48,067		917,910 141,405 58,140
Total Project							277,508	261,480	578,467		1,117,455
Project 2260				Pa_{i}	Page 5 of 5 Pages	S		Exh	Exhibit R-3 (PE 0604861C)	0604861C)	

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RDT&E BUDGET ITEM	-	TIFICA	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Fet	February 1997	97
BUDGET ACTIVITY 5 - Engineering and Manufacturing Devel)evelopment	ent	PE N 060	PE NUMBER AND TITLE 0604864C Battle Management and C41 for TMD Acquisition	ritle Sattle Mar	падетеп	t and C4	1 for TMI		PROJECT 3261
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
3261 TMD BM/C3I (BM/C3I Concepts	10,118	0	0	0	0	0	0	0	TBD	ТВО

A. Mission Description and Budget Item Justification

Control, Communications, and Intelligence (BM/C3I) capability having the flexibility to meet a wide range of threats and expected needs. The BM/C3I architecture for sensors, interceptors, and C2 nodes and to synergize their individual contributions to an integrated Joint theater-wide TMD system. BMDO has three major thrusts to TMD is built upon the existing command and control (C2) structure for Theater Air Defense (TAD) and adds the communications linking TMD C2 nodes, weapons, The primary mission of this project is to provide the warfighter with an integrated and interoperable Theater Missile Defense (TMD) Battle Management/Command, independent weapon systems development and to provide guidance, standards, equipment, integration, and analysis to maximize the performance of a multitude of and sensors, and the TMD interfaces to intelligence systems and other supporting capabilities. The BMDO, from its joint perspective, uses this project to oversee the TMD BM/C3I integration program.

intelligence systems external to TMD. This project supports the system engineering of their capability and prototype development of items such as improved displays The first thrust establishes the links and means for receipt and in-theater early warning and dissemination of launch warning information from space-based and for early in-theater warning information. This project focuses on linking separate external systems into the theater.

Distribution System (JTIDS) and the Tactical Data Information Link-JTIDS (TADIL-J) message format. This project integrates JTIDS terminals into existing Theater communications equipment, and protocols as well as the common command and control procedures among different weapons systems to ensure a truly integrated Ballistic Missile Defense (TBMD) C2 platforms and provides the necessary software upgrades. This funding is critical for timely inter-Service interoperability. The second thrust of the BM/C3I program focuses on communication of, and interoperability among, TMD weapon systems. Interoperability includes both the theater-wide ballistic missile defense system. The cornerstone of TMD interoperability is the Joint Data Net (JDN) which uses the Joint Tactical Information

The third thrust of the BM/C3I program directs attention to upgrades of Service C2 centers. Various command center upgrades are included in this project to reduce decision-making time necessary to effectively engage ballistic missiles. Again, BMDO leverages off several existing Service-funded theater air defense command center upgrades and this project funds only the specific TMD-related aspects of these upgrades. BMDO's central direction and support of hardware and software developments will produce an integrated C2 capability for TMD.

The joint warfighters and BM/C3I developers evaluate the effects of early warning, improved interoperability, integration, and command center upgrades on joint TBMD doctrine through BM/C3I work shops and analysis.

Project 3261

Page 1 of 3 Pages

Exhibit R-2 (PE 0604864C)

RE	RDT&E BUDGET ITEM JUSTIFICATIOI	USTIFICATION SHEET (R-2 Exhibit)	DATE February 1997	
BUDGET ACTIVITY 5 - Engineering a	BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604864C Battle Management and C41 for TMD Acquisition	C41 for TMD 3261	РКОЈЕСТ 3261
All of the efforts in the times and allow more other friendly forces.	nis project are designed to provide s opportunities to efficiently and e	a seamless interoperable architecture to provide timely warning and information necessary to reduce decision f fectively engage hostile missiles. The end result will kill more missiles and will reduce casualties to U.S. and	mation necessary to reduce dec nd will reduce casualties to U.S.	sion
FY 1996 (\$ in Thousands) - \$10,118 Joint Infor Integ supp and r - \$10,118 Total	/Combined: Conduct TMD mation Distribution System ration Capability (CIC) and ort of TMD; support inter-Sefine existing messages.	BM/C3I work shops; conduct command and control (C2) tests to refine C2 procedures; initiate Multifunctional (MIDS) Army development efforts; complete rapid & contingency deployable prototypes of the Combat the Sector Anti-Air Warfare Facility (SAAWF); conduct modeling and analysis of JTIDS network structure in ervice integration efforts; initiate joint TMD planning capability; develop follow-on TADIL-J messages; test	2 procedures; initiate Multifunc able prototypes of the Combat alysis of JTIDS network structi follow-on TADIL-J messages; t	ional re in
FY 1997 (\$ in Thousands): - \$0 - \$0 Total	isands): Total			
FY 1998 (\$ in Thousands): - \$0 - \$0 Total	isands): Total			
FY 1999 (\$ in Thousands): - \$0 - \$0 Total	isands): Total			
Acquisition Strates accomplishes suppo managed service pr	Acquisition Strategy: The 3261 Project acquisition strategy leverages existing system acquisition programs (which are subject to milestone decisions and testing) and accomplishes supporting tasks to satisfy BM/C31 performance requirements. A significant portion of this project entails systems engineering of separately funded and managed service programs so that all systems will interoperate when fielded.	g system acquisition programs (which are subject to milestone decisions and testing) and A significant portion of this project entails systems engineering of separately funded and	o milestone decisions and testing engineering of separately fund	ona (
Project 3261	Pag	Page 2 of 3 Pages	Exhibit R-2 (PE 0604864C)	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	TION SH	EET (R-	2 Exhib	Œ		DATE Febru	February 1997	
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUI 0604 Acq	PE NUMBER AND TITLE 0604864C Battle Management and C41 for TMD Acquisition	กะ Ittle Mana	agement	and C41	for TMD	3261	
B. Program Change Summary (\$ in Thousands) FY 1996 Previous President's Budget Current Budget Submit/President's Budget 10,118		FY 1997 I	FY 1998 0 0	FY 1999 0		Total <u>Cost</u> 13,885 10,118		
Change Summary Explanation: Funding: Congressional direction eliminated the TMD BM/C3I program elements 0603864/0604864C and placed this project under the Joint TMD activities program element. Consistent with this direction, a determination was made that this program is more appropriately funded with Dem/Val funds. Navy tasks supporting the Navy Area TBMD program were deleted from this project for FY1997 and beyond and funded under the Navy Area TBMD program element (Project 2263) to unify control.	ogram elements as made that th project for FY	s 0603864/06 nis program is 1997 and bey	04864C and s more appro ond and fund	placed this ; priately fun led under th	project und ded with De e Navy Are	er the Joint TM em/Val funds.] a TBMD progra	MD BM/C31 program elements 0603864/0604864C and placed this project under the Joint TMD activities determination was made that this program is more appropriately funded with Dem/Val funds. Navy tasks directly leleted from this project for FY1997 and beyond and funded under the Navy Area TBMD program element	ıtly
Schedule: None								
Technical: None								
C. Other Program Funding Summary (S in Thousands)								
While this program is not dependent upon funding from other programs, it supports these programs by providing capstone systems engineering, common BM/C31 guidance, government furnished equipment, interface support, joint network design analysis, and other actions necessary to achieve interoperability among independent systems.	: supports these rk design analy	programs by rsis, and other	providing c r actions nec	apstone syst essary to acl	tems engine hieve intero	ering, common perability amot	.BM/C3I ng independent	
3261 TMD BM/C31 PE: 0603864C 27,382 0 3261 TMD BM/C31 PE: 063872C 0 32,357	Z FY 1998 0 0 7 34,094	FY 1999 0 35,864	FY 2000 0 43,717	FY 2001 0 44,576	FY 2002 0 43,210	FX 2003 0 43,286	To To Compl C	Total Cost TBD Cont
D. Schedule Profile								
Project 3261	Page 3 of 3 Pages	3 Pages			Exhibil	Exhibit R-2 (PE 0604864C)	4864C)	

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RDT&E BUDGET ITEM J		TIFICA	TION SH	USTIFICATION SHEET (R-2 Exhibit)	-2 Exhi	bit)		DATE Fel	February 1997	197
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	Developm	ent	PE NE 000	PE NUMBER AND TITLE 0604865C Patriot PAC-3	птсе atriot P/	\C-3			4.0	РВОЈЕСТ 2257
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2257 PATRIOT PAC-3	352,547	381,092	206,057	101,430	0	0	0	0	TBD	TBD
A. Mission Description and Budget Item Justification PATRIOT is a long-range, mobile, field Army and Corps air defense system, which uses guided missiles to simultaneously engage and destroy multiple targets at varying ranges. The PATRIOT Advanced Capability Level 3 (PAC-3) Upgrade Program is the latest evolution of the phased material change improvement program to PATRIOT. The material changes will provide improved performance across the spectrum for system and threat intercept performance. The material changes include a new PAC-3 missile (previously known as ERINT), remote launch capabilities, communications and computer/software improvements, and radar upgrades to enhance system performance by improving its multi-function capability for tracking, and target handling capability against air breathing, ballistic and cruise missile threats. The PATRIOT operates as lower tier of the Army's Theater Missile Defense (TMD) task force and is developing the capacity to interact with the Navy Cooperative Engagement Capability (CEC) system. PATRIOT is pursuing integration of PATRIOT program.	ication y and Corps ai apability Level le improved pe INT), remote I unction capabi 's Theater Miss RIOT is pursui	r defense sy: 3 (PAC-3) 1 riformance a aunch capab lity for track sile Defense ng integratic	stem, which Upgrade Pro cross the spe ilities, comming, and targ (TMD) task on of PATRI ted into the I	uses guided gram is the I cetrum for sy nunications get handling force and is OT BMC31	missiles to satest evolutions and compute capability a developing with the Prorogram.	simultaneous ion of the ph reat intercept sr/software in gainst air bre the capacity the capacity ject Manage	ly engage an ased materia t performan mprovement athing, balli to interact v r, Air Defen	nd destroy m il change imp ce. The mate is, and radar istic and crui vith the Navy	ultiple targe provement p crial changes upgrades to se missile th y Cooperativ d and Contro	is at rogram to include a enhance reats. The c
FY 1996 (\$ in Thousands): - \$259,892 Continued PAC-3 missile Engineering and Manufacturing Development (EMD) program; begin formal flight testing; conducted missile Critical Design Review (CDR). - \$64,296 Continued ground systems modifications development program and TMD/Theater High Altitude Area Defense (THAAD) integration/cueing	ile Engineering ems modificati	; and Manuf	acturing Dev	/elopment (F	3MD) progra Theater Hig	am; begin foi h Altitude A	rmal flight te rea Defense	esting; condu (THAAD) ii	ucted missile ntegration/cu	Critical leing
program. - \$15,911 Initiated PAC-3 EMD target and test support, including advanced threat-like reentry vehicles. - \$11,727 Continued operational test and evaluation and lethality efforts. - \$721 Government personnel to support lethality efforts in FY96. - \$352,547 Total	arget and test stest and evalua	upport, inch tion and leth ality efforts	ıding advanality efforts. in FY96.	ced threat-lil	ce reentry vo	chicles.				
FY 1997 (\$\sum \text{in Thousands}): - \$293,914 Continue PAC-3 missile EMD program and formal flight testing. - \$27,382 Continue PAC-3 EMD target and test support, including target build-up for FY98 testing. - \$18,443 Continue operational test and evaluation and lethality efforts. - \$40,767 Continue ground systems modifications development program. - \$ \$86 SBIR Reduction. - \$381,092 Total	e EMD prograitarget and test stand evaluations modifications	m and forma support, incl on and letha is developm	l flight testii luding target lity efforts. ent program	ag. : build-up fo	r FY98 testi	82				
Project 2257			Page 1 of 6 Pages	6 Pages			Exhib	Exhibit R-2 (PE 0604865C)	604865C)	

RDT&E BUDGET ITEM JUSTIFI	CATION	SHEET (USTIFICATION SHEET (R-2 Exhibit)	t	DATE February 1997	
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development		PE NUMBER AND TITLE 0604865C Patri	PE NUMBER AND TITLE 0604865C Patriot PAC-3	<u>ب</u>	PROJECT 2257	Z FCT
FY 1998 (\$\sum \text{in Thousands}): - \$160,191 Continue PAC-3 missile EMD program with formal flight testing. - \$24,990 Continue PAC-3 EMD target and test support, provide target press - \$16,052 Continue operational test and evaluation and lethality efforts. - \$4,824 Complete modifications development program. - \$206,057 Total	formal fligh t, provide ta lethality eff m.	nt testing. irget presentation orts.	of White Sand	Missile Range	ogram with formal flight testing. test support, provide target presentation of White Sands Missile Range (WSMR) New Mexico. luation and lethality efforts. nent program.	
FY 1999 (\$ in Thousands): - \$93,844 Complete PAC-3 Missile EMD program. - \$2,724 Complete PAC-3 EMD target and test support. - \$4,862 Complete PAC-3 operational test and evaluation. - \$101,430 Total	rt. tion and leth	rogram. I test support. and evaluation and lethality efforts.				
Acquisition Strategy: The PAC-3 Upgrade Program will provide enhancements to the current PATRIOT system through a series of upgrades divided into three configurations which will be individually tested and procured. Missile and ground equipment configurations will be fielded through hardware retrofit and concurrently released software builds. During EMD, an expanded risk reduction/mitigation program (PE: 0604866C, Proj: 2257) was implemented to address areas of risk identified during the Dem/Val phase. The PAC-3 Risk Reduction and Mitigation program is a multi-faceted effort involving two prime contractors and three contracts. The risk reduction/mitigation modification efforts are for existing EMD contracts with each of the two prime contractors.	cements to the ground e gation program is a program is a with each o	he current PATK equipment confi ram (PE: 06048 multi-faceted e: of the two prime	UOT system thr gurations will be 66C, Proj: 2257) ffort involving tr contractors.	ough a series of fielded through was implement wo prime contra	upgrades divided into three I hardware retrofit and concurrentl ed to address areas of risk identific ctors and three contracts. The risk	. 10
B. Program Change Summary (\$ in Thousands)					-t-t-t-	
	EY 1996 363,008	FY 1997 381,509 381,509	FY 1998 195,337	FY 1999 101,262	1.041,116	
Adjustment to Appropriated Value: a. General Reduction (FFRDC, Inflation etc.) FY 1998 President's Budget Request 3	352,547	-417 381,092	206,057	101,430	1,041,126	
Project 2257	Page	Page 2 of 6 Pages			Exhibit R-2 (PE 0604865C)	

BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	M JUSTIFIC	CATION 8	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhib	oit)	;	DATE Febi	February 1997	71
	velopment	PE 0	PE NUMBER AND TITLE 0604865C Patriot PAC-3	nte atriot PA(C-3			PR 22	РКОЈЕСТ 2257
Change Summary Explanation: Funding: FY 1996 (+ 126): Realigned from PE 0604866C (+126). FY 1997 (- 417): Project decremented for undistributed Defense-Wide reductions. FY 1998 (+10,720): Project decremented (-640) for undistributed Defense-Wide reductions. Fy 1999 (+ 168): Project decremented (-470) for undistributed Defense-Wide reductions. Fy 1999 (+ 168): Project decremented (-470) for undistributed Defense-Wide reductions. Funds realigned (+638) from procurement. Schedule: The EMD program was extended to 4QFY99 in accordance with Department of Defense guidance. Technical: None	Realigned from PE 0604866C (+126). Project decremented for undistributed Defens Project decremented (-640) for undistributed I Funds realigned (+11,360) from procurement. Project decremented (-470) for undistributed I Funds realigned (+638) from procurement. was extended to 4QFY99 in accordance with I	126). buted Defense- indistributed D. procurement. indistributed D. curement. rdance with De	Wide reduction efense-Wide rec efense-Wide rec spartment of De	s. Juctions. Juctions. fense guidan	ice.				
C. Other Program Funding Summary (\$ in Thousands)	(spur							£	E
E 2257, PAC3 Procurement, PE 0208865C 2257. Risk Reduction Mitigation. PE 0604866C	EY 1996 FY 1997 285,989 219,413 23,358	997 FY 1998 413	8 FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Compl	Cost 976,698 92,686
2257, Major MILCON, PE 0603865C Missile Procurement, Army, (2032a), PAC3 *Army TOA	1,349	349,109	9 369,885	459,233	445,367	433,145	396,760	Cont	1,349 Cont
D. Scheduje Profile	FY 1996		FY 1997 2	-	FY 1998	⊗l ω 4	1 E	FY 1999 2 3	4
Configuration 1 First Unit Equipped(FUE) PAC-3 Missile CDR Configuration 2 Contractor Development Test and Evaluation (CDT&E) Configuration 2 Follow-On Test and Evaluation (FOT&E) PDB-4 Software Release Configuration 2 FUE Controlled Test Flight 1 Controlled Test Flight 2 Guidance Test Flight 1	n *		X X Page 3 of 6 Pages	× ×	N		T 1 2 3	04865C)	+

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RDT&E BUDGET ITEM JUSTIFICATION	USTIFICATION SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604865C Patriot PAC-3	PROJECT 2257
PAC-3 Missile Low-Rate Initial Production (LRIP) Configuration 3 CDT&E Configuration 3 Initial Operational Test ADB-5 Software Release PAC-3 FUE Milestone III (FRP)		4 1 2 3 X X
Project 2257	Page 4 of 6 Pages	Exhibit R-2 (PE 0604865C)

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RD.	RDT&E PROGRAM ELEME	SRAM EL		NT/PROJECT COST BREAKDOWN (R-3)	COSTB	REAKD	OWN (R-	3)	DATE Fe	February 1997	97
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	g and Manu	ifacturing l	Jevelopme	ent	РЕ NUMBE 060486	PE NUMBER AND TITLE 0604865C Patriot PAC-3	t PAC-3			9 Z	РRОЈЕСТ 2257
A. Project Cost Breakdown (S in Thousands)	.eakdown (\$ in	Thousands)									
				FY 1996		FY 1997	FY 1998	FY 1999			
PAC-3 Missile (EMD) Total	Ω			352,547 352,547		381,092 381,092	206,057 206,057	101,430			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	tion History and	d Planning Inf	ormation (\$ i	n Thousands)							
Performing Organizations:	izations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations Raytheon(CDI SS-CPIF	nt Organizations SS-CPIF	, Jul-93		•	48,550	17,450	4,500				70,500
Raytheon Remote	SS-CPIF	Nov-95			3,000	22,000	31,500	10,000			66,500
Launch/Common Raytheon (Integr) LMVS (EMD) RDEC (OGA)	SS-CPIF SS-CPIF	Oct-94 Oct-94			22,521 165,000 10,355	30,000 200,000 13,100	47,700 171,441 13,462	25,000 84,000 10,500	13,000 37,944 8,500		138,221 658,385 55,917
Support and Management Organizations Nichols MIPR CAS SS-CPIF OGA/In-house PO Raytheon (E/S) SS-CPIF SBIR Reduction Govt Proj Per & Spt	ement Organizat MIPR SS-CPIF PO SS-CPIF	ions		Pa	3,040 4,850 8,805 12,047 0	3,390 4,736 10,724 10,720 460	4,681 5,901 18,919 19,835 586 435	5,259 6,371 8,002 434	9 4,400 1 5,935 2 7,000 4 Exhibit R-3 (PE 0604865C)	0604865C)	11,111 25,146 50,754 57,604 586 1,329

RDT&E	PROG	RDT&E PROGRAM ELEME		NT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3	(E)	DATE Fe	February 1997	97
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	d Manu	facturing	Developme	•nt	PE NUMBER AND TITLE 0604865C Patri	AND TITLE C Patriot	ЭТПЕ Patriot PAC-3			1 14	PROJECT 2257
Contractor or Contract Government Method/ Performing or Fundii Activity Vehicle	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to EY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Test and Evaluation Organizations WSMR/ARL MIPR OT&E MIPR Targets MIPR Lethality MIPR	nizations R R R				8,555 600 0 2,837	12,068 5,760 14,611 7,528	16,742 2,579 27,382 15,429	15,883 6,537 24,990 9,081	17,065 1,534 2,724 3,328		70,313 17,010 69,707 38,203
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands) Government Furnished Property: Contract Method/Type Award or Item or Funding Obligation Delivery Description Vehicle Date Date EY 199	n History and the Property: Contract Method/Type or Funding	Planning Inf Award or Obligation Date	formation.Con Delivery Date	ntinued (S in Tl	nousands) Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Property Support and Management Property	perty Property										
Test and Evaluation Property	arty										
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation Total Project	ment iagement ion			•	249,426 28,742 11,992 290,160	282,550 30,030 39,967 352,547	268,603 50,357 62,132 381,092	129,500 20,066 56,491 206,057	59,444 17,335 24,651 101,430		989,523 146,530 195,233 1,331,286
Project 2257				Pa	Page 6 of 6 Pages	8		Exhi	Exhibit R-3 (PE 0604865C)	0604865C)	



RDT&E BUDGET ITEM		TIFICA	TION SI	HEET (R	JUSTIFICATION SHEET (R-2 Exhibit)	bit)		DATE Fel	February 1997	760
BUDGET ACTIVITY 5 - Engineering and Manufacturing Devel	Jevelopment	ent	PE NUM 0604 TMD	PE NUMBER AND TITLE 0604866C ERINT TMD	PE NUMBER AND TITLE 0604866C ERINT/Patriot PAC-3 Risk Reduction TMD	triot PAC	-3 Risk F	Reduction		PROJECT 2257
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2257 PAC3 Risk Reduction	23,358	0	0	0	0	0	0	0	TBD	TBD
A. Mission Description and Budget Item Justification The ERINT was selected as the PAC-3 missile as a result of successful tests and a thorough evaluation of the missile's capabilities by the U.S. Army. The Dem/Val missile conducted three successful intercepts against tactical ballistic missile and air breathing targets. Following the missile selection, a Defense Acquisition Board (DAB) review of the PAC-3 program was conducted resulting in approval for the PAC-3 missile to enter Engineering and Manufacturing Development (EMD). In support of this decision, the PAC-3 system with major upgrades divided into three steps/configuration. Configuration of the PAC-3 System with major upgrades divided into three steps/configurations. Configuration of the PAC-3 System with major upgrades divided into three steps/configuration includes an Expanded Weapons Control Computer (EWCC), an Optical Disk (OD), an Embedded Data Recorder, a Pulse Doppler Processor and a Guidance Enhancement Missile (GEM). Although GEM is not included as a part of Configuration 2, it is included for fielding. Configuration 2 cannopleted comprehensive software testing and received a production decision during Oct 95 for Communication Enhancement Phase II, and Classification, Discrimination, and Identification (CDI) Phase I. Configuration 3 completed a System Design Review (SDR) and a Preliminary Design Review (PDR) for the PAC-3 missile segment during FY 95. In addition to the new missile, Configuration 3 also includes Radar Enhancements to the system, continuing work on PAC-3 integration, and continuing PAC-3 missile EMD. PATRIOT is pursuing integration of PATRIOT program. PATRIOT BMC3I with the Project Manager, Air Defense Command and Control Systems to take advantage of previous Army developments that can be incorporated into the PATRIOT program.	ation as a result of as a result of gainst tactica ducted resulti n Program Bs ades divided s configuratio idance Enhan nent Phase II, gn Review (P hase III, and vystem, contii r, Air Defens	successful t I ballistic mi mg in approv iseline (APF into three st into three st in includes a cement Miss re testing an and Classiff DR) for the I Remote Lau uuing work c	ests and a th ssile and air al for the PA sylvan appropriate (GEM). The cation, Discontification, Disc	orough eval breathing ta AC-3 missile wed during ations. Com Weapons Co Although Go production rimination, a lie segment nications En legration, an Systems to	seult of successful tests and a thorough evaluation of the missile's capabilities by the U.S. Army. The Dem/Val tactical ballistic missile and air breathing targets. Following the missile selection, a Defense Acquisition Board resulting in approval for the PAC-3 missile to enter Engineering and Manufacturing Development (EMD). In ram Baseline (APB) was approved during Feb 95. Efforts have been moving forward in the development and ivided into three steps/configurations. Configuration 1 completed Production Confirmatory Testing with First Uniguration includes an Expanded Weapons Control Computer (EWCC), an Optical Disk (OD), an Embedded Data Enhancement Missile (GEM). Although GEM is not included as a part of Configuration 1, it is included for software testing and received a production decision during Oct 95 for Communication Enhancement Phase I. nase II, and Classification, Discrimination, and Identification (CDI) Phase I. Configuration 3 completed a System iew (PDR) for the PAC-3 missile segment during FY 95. In addition to the new missile, Configuration 3 also 1, and Remote Launcth/Communications Enhancement Upgrades (RL/CEU). Efforts now focus on completing the continuing work on PAC-3 integration, and continuing PAC-3 missile EMD. PATRIOT is pursuing integration Defense Command and Control Systems to take advantage of previous Army developments that can be	missile's ca wing the mis gineering an orts have bee completed P uter (EWCC cluded as a ing Oct 95 fo ation (CDI) i. In additio Jpgrades (RI PAC-3 miss	pabilities by saile selection d Manufactum moving foroduction Corollogue part of Configuration of Configurat	the U.S. Arr n, a Defense ring Develor rward in the onfirmatory (Disk (OD), iguration 1, cation Enhan figuration 3 missile, Con missile, Con ATRIOT is	my. The Der Acquisition pment (EMI developmer Testing with an Embedde it is included neement Pha neement Pha neement Pha neement Pha pursuing int that can be	m/Val Board)). In nt and First Unit ed Data I for se I. se I. a System i also letting the egration
FY 1996 (\$\subseteq\$ in Thousands): - \$23,358 Continuation of the Risk Reduction/Mitigation program. - \$23,358 Total	Reduction/M	litigation prc	ogram.							
FY 1997 (\$ in Thousands): - \$0 - \$0 Total										
FY 1998 (\$ in Thousands): - \$0 - \$0 Total										
Project 2257			Page 1 of 2 Pages	2 Pages		į	Exhibi	Exhibit R-2 (PE 0604866C)	604866C)	

RDT&E BUDGET ITEM J		IIFICAT	HS NOI	EET (R	USTIFICATION SHEET (R-2 Exhibit)	oit)		DATE Feb	February 1997	97
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	evelopme	int	PE NUM 0604 TMD	PE NUMBER AND TITLE 0604866C ERINT TMD	пе RINT/Pat	riot PAC	-3 Risk F	PE NUMBER AND TITLE 0604866C ERINT/Patriot PAC-3 Risk Reduction TMD		PROJECT 2257
FY 1999 (\$ in Thousands): - \$0 - \$0 Total										
B. Program Change Summary (\$ in Thousands)										
Previous President's Budget Appropriated		EX 1996 18,967 19,485		FY 1997 0	FY 1998 0	FY 1999 0	6 0	Lotal Cost 18,967		
Adjustment to Appropriated Current Budget Submit/President's Budget		3,873 23,358		0	0		0	23,358		
Change Summary Explanation: Funding: FY 1996 (+3,873): TRF Payback, FY95 Schedule: None. Technical: None.		99); realigne	id to PE 060	(+3.999); realigned to PE 0604865C (-126)	6					
C. Other Program Funding Summary (8 in Thousands)	sands)								E	Ę
2257, PAC3 Procurement, PE 0208865C 2257, EMD, Pl 184865C	FY 1996 285,989 352,547	FY 1997 219,413 381,092	FY 1998 206,057	EY 1999 101,403	EY 2000	FY 2001	FY 2002	FY 2003	Lompi	Lotal Cost 976,698 92,686
2257, Major MILCON, PE 0603865C PAC3 Procurement, SSN C49200* *Army TOA	1,349		349,109	369,885	459,233	445,367	433,145	396,760	CONT	1,349 CONT
D. Schedule Profile	FY 1996 2 3	4	1 2	F <u>Y 1997</u> 2 3	4	FY 1998 2 3	3 4	77	FY 1999 2 3	4
Project 2257			Page 2 of 2 Pages	Pages			Exhibi	Exhibit R-2 (PE 0604866C)	04866C)	

RDT&E BUDGET ITEM	-	TIFICA	JUSTIFICATION SHEET (R-2 Exhibit)	HEET (F	≀-2 Exhi	bit)		DATE Fel	February 1997	97
BUDGET ACTIVITY 5 - Engineering and Manufacturing Devel	Development	ent	PE NI 0 90	PE NUMBER AND TITLE 0604867C Navy	DE04867C Navy Area TMD	а ТМD			2	PROJECT 2263
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
2263 Navy Area TMD	0	241,330	267,822	226,748	222,145	158,271	52,433	38,089	Continuing	Continuing
To see the other Program Elements and Appropriations associated with Navy Area TMD, see section C of this R2.	priations asso	ciated with	Navy Area	TMD, see s	ection C of t	lhis R2.				
A. Mission Description and Budget Item Justification The Navy Area Theater Ballistic Missile Defense (TBMD) project builds on the national investment in AEGIS ships, weapon systems, and Navy Standard Missile II (SM-2) Block IV missiles. Two classes of ships continue to be deployed with the AEGIS combat system: the CG-47 Ticonderoga-class cruisers and the DDG-51 Burke-class destroyers. Navy TBMD will take advantage of the attributes of naval forces including overseas presence, mobility, flexibility, and sustainability in order to provide protection to debarkation ports, coastal airfields, amphibious objective areas, Allied forces ashore, and other high value sites. Navy assets will provide an option for initial TBMD allowing the insertion of additional land-based TBMD assets and other expeditionary forces in an opposed environment.	ication ense (TBMD) iips continue to ke advantage constal airfields, on of additiona	project build be deploye of the attribul amphibious	is on the nati d with the A tes of naval i objective ar TBMD asse	ional investr EGIS combs forces includ eas, Allied f	nent in AEG at system: th ling overseas orces ashore expeditionar	IS ships, were ne CG-47 Tic s presence, ir , and other h	apon system conderoga-c nobility, flex igh value sii n opposed e	s, and Navy lass cruisers ibility, and s ies. Navy ass	MD) project builds on the national investment in AEGIS ships, weapon systems, and Navy Standard Missile II nue to be deployed with the AEGIS combat system: the CG-47 Ticonderoga-class cruisers and the DDG-51 tage of the attributes of naval forces including overseas presence, mobility, flexibility, and sustainability in ord ields, amphibious objective areas, Allied forces ashore, and other high value sites. Navy assets will provide an itional land-based TBMD assets and other expeditionary forces in an opposed environment.	ssile II 1-51 in order ide an
FY 1996 (\$.in.Thousands): - \$0 No funding in Fiscal Year 1996 - \$0 Total	ear 1996									
EX 1997 (\$ in Thousands): - \$236,099 Continue systems engineering and analysis. Continue development of User Operational Evaluation System (UOES) and tactical computer programs; initiate development of computer program design specifications for the Tactical Program; conduct Tactical Program system design review (SDR) and preliminary design review (PDR); conduct UOES critical design review (CDR). Continue detailed missile design. Continue procurement and fabrication of Engineering and Manufacturing Development (EMD) test rounds. Provide technical support for AEGIS weapon system design activities. Continue test planning. Continue required lethality analyses, lethality model refinements and testing in support of Live	neering and an lopment of con iminary design sation of Engins. Continue tes.	alysis. Cont nputer progr review (PD) eering and N	inue develop ram design sl R); conduct danufacturin Continue rec	oment of Use pecifications UOES critic ig Developm	er Operations for the Tact al design revent (EMD) ity analyses,	al Evaluation lical Program riew (CDR). lest rounds. lethality mo	i System (Uon; conduct T Continue de Provide tech del refinem	OES) and tac actical Progr etailed missi mical suppoi	indianalysis. Continue development of User Operational Evaluation System (UOES) and tactical computer of computer program design specifications for the Tactical Program; conduct Tactical Program system design lesign review (PDR); conduct UOES critical design review (CDR). Continue detailed missile design. Continue Engineering and Manufacturing Development (EMD) test rounds. Provide technical support for AEGIS weapon use test planning. Continue required lethality analyses, lethality model refinements and testing in support of Live	er esign ontinue weapon t of Live
Fire Test & Evaluation (LFT&E). Initiate procurement of high fidelity sled track test targets for the FY98-99 LFT&E. Continue to design the interface for TBMD-related upgrades to AEGIS and Joint Maritime Command Information System (JMCIS). Continue Command and Control Processor (C2P) development. - \$5,231 Continue building, and delivery of, targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets. - \$241,330 Total	(LFT&E). Inilated upgrades opment. delivery of, ta	ttiate procure to AEGIS at rgets to supp	ement of higl nd Joint Mar oort Navy TE	h fidelity sle itime Comn 3MD flight t	d track test to and Informatests. Mainta	 Initiate procurement of high fidelity sled track test targets for the FY98-99 LFT&E. Continurades to AEGIS and Joint Maritime Command Information System (JMCIS). Continue Comma of, targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets. 	5 FY98-99 I (JMCIS). (ture to supp	FT&E. Cor Continue Cor ort TMD tar,	mmand and (gets)	gn the Control
Project 2263			Page I of 7 Pages	7 Pages			Exhib	Exhibit R-2 (PE 0604867C))604867C)	

RDT&E BUDGET ITEM J	ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET (R-2 Exhib	t)	DATE February 1997	
BUDGET ACTIVITY 5 - Engineering and Manufacturing Develor	g Development	PE NUMBER AND TITLE 0604867C Navy	PE NUMBER AND TITLE 0604867C Navy Area TMD	IMD	PROJECT 2263	5
FY 1998 (\$ in Thousands): - \$ 258,845 Continue tactical computer progra Enginecring/Manufacturing developments and White Sands Missl support for AEGIS Weapon System implementation of JMCIS TBMD - \$8,977 Continue building and delivery of Total	Londinue tactical computer program development; deliver AEGIS UOES computer program; conduct tactical program CDR. Continue Engineering/Manufacturing development of the missile. Begin delivery of Inert Operational Missile(IOM)/Engineering Design Model test rounds and White Sands Missle Range (WSMR) New Mexico flight test missiles. Continue fabrication of UOES missiles. Provide support for AEGIS Weapon System design activities. Continue LFT&E activities. Continue Systems Engineering and Analysis. Continue implementation of IMCIS TBMD segments and TBMD messages in C2P. Continue building and delivery of targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets.	liver AEGIS UOES le. Begin delivery New Mexico flight Continue LFT&E a ID messages in C2P lavy TBMD flight	computer progr of Inert Operatic est missiles. Co ctivities. Contii	am; conduct tac nal Missile(ION ntinue fabricati nue Systems Ent nfrastructure to	Londinue tactical computer program development; deliver AEGIS UOES computer program; conduct tactical program CDR. Continue Engineering/Manufacturing development of the missile. Begin delivery of Inert Operational Missile(IOM)/Engineering Design Model (EDM) test rounds and White Sands Missle Range (WSMR) New Mexico flight test missiles. Continue fabrication of UOES missiles. Provide technical support for AEGIS Weapon System design activities. Continue LFT&E activities. Continue Systems Engineering and Analysis. Continue implementation of MCIS TBMD segments and TBMD messages in C2P. Continue building and delivery of targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets.) ical
FY 1999 (\$ in Thousands): - \$185,590 Continue tactical computer programissile. Continue delivery of IOM missile at WSMR. Continue LFT2 - \$41,158 Continue building and delivery of Total	unds): Continue factical computer program development. Integrate EMD IOM round into AEGIS UOES computer program. Continue EMI missile. Continue delivery of IOM/EDM test round, WSMR flight test missiles and UOES/EMD missiles. Begin Developmental Test missile at WSMR. Continue LFT&E activities. Continue implementation of IMCIS TBMD segments and TBMD messages in C2P. Continue building and delivery of targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets.	egrate EMD IOM r VSMR flight test mi inue implementatio lavy TBMD flight t	ound into AEGI ssiles and UOE 1 of JMCIS TBN ests. Maintain i	S UOES compu S/EMD missiles AD segments an nfrastructure to	Lontinue factical computer program development. Integrate EMD IOM round into AEGIS UOES computer program. Continue EMD of the missile. Continue delivery of IOM/EDM test round, WSMR flight test missiles and UOES/EMD missiles. Begin Developmental Testing (DT) of missile at WSMR. Continue LFT&E activities. Continue implementation of JMCIS TBMD segments and TBMD messages in C2P. Continue building and delivery of targets to support Navy TBMD flight tests. Maintain infrastructure to support TMD targets.) of
Acquisition Strategy: This strategy consists of a Navy Area TBMD Program evolving to a Theater-Wide Defense TBMD program. The Navy Area Program will build on existing force structure by modifying the SM-2 Block IV missile and AEGIS Combat System to achieve TBMD capability. B. Program Change Summary (\$\subseteq\$ in Thousands)	Navy Area TBMD Program evo Slock IV missile and AEGIS Co. <u>ds)</u>	olving to a Theater-Ymbat System to achi	Vide Defense T eve TBMD cap	BMD program. ability.	The Navy Area Program will build	Ę.
Previous President's Budget Appropriated Value	EY 19 <u>96</u> 9: 32	EX 1997 241,582 241,582	EY 1998 268,470	FY 1999 226,119	Total <u>Cost</u> 831,903	
Adjustments to Appropriated Value: a. General Reductions (FFRDC, Inflation etc.) Current Budget Submit/President's Budget	itc.) , 0	-252 241,330	267,822	226,748	735,900	
Change Summary Explanation: Funding: Delays in the risk reduction flight tests, SM-2 Blk IVA design immaturity, and cost growth in targets necessitated a program restructure and an FY96 notification reprogramming from P.E. 0604867C to P.E. 0603867C. Additional risk reduction flight test delays in early FY1997 necessitated a request to reprogram funds from P.E. 060487C to 060387C.	ght tests, SM-2 Blk IVA design 604867C to P.E. 0603867C. Ad	immaturity, and co Iditional risk reduct	st growth in targ on flight test de	ets necessitated lays in early FY	a program restructure and an FY96 1997 necessitated a request to repro	gram
Project 2263	P	Page 2 of 7 Pages			Exhibit R-2 (PE 0604867C)	



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	M JUST	FICAT	ION SHI	EET (R-	2 Exhib	it)		DATE Feb	February 1997	7
BUDGET ACTIVITY 5 - Engineering and Manufacturing Develo	velopment	ı,	PE NUN 0604	PE NUMBER AND TITLE 0604867C Navy Area TMD	TLE AVY Area	TMD			PROJE 2263	РRОЈЕСТ 2263
Schedule: The January 1996 program restructure included a delay in both UOES and First Unit Equipped (FUE) dates. The Navy Area TBMD Program, within the FY97 President's Budget, supported an SM-2 Block IVA UOES capability in FY1999 and First Unit Equipped (FUE) in FY2001. However, due to concerns with 1996 flight test delays, and to allow a longer test period to accommodate more conservative Developmental Testing/perational Testing schedule, UOES is projected for FY2000 and FUE in FY2002. Following an independent life cycle cost estimate of the rebaselined program and successful completion of the Milestone II DAB, these schedules will be reassessed.	ure included Block IVA L est period to an independe	a delay in b 10ES capab accommod nt life cycle	oth UOES a oility in FY19 ate more con cost estima	nd First Um 999 and Firs servative D te of the reb	t Equipped it Unit Equip evelopments aselined pro	(FUE) date oped (FUE) al Testing/p gram and si	i. The Navy in FY2001. rational Te iccessful co	v Area TBML However, d sting schedulk mpletion of th	Program, w ue to concern s, UOES is pr ne Milestone	thin the s with ojected II DAB,
Technical: Additional lethality analysis and testing have been included in the program as a result of the January 1996 restructure.	sting have be	en include	d in the prog	ram as a res	ult of the Ja	nuary 1996	restructure.			
C. Other Program Funding Summary (\$ in Thousands)	(spur									
2263, Navy Area TMD (Dem/Val), PE 0603867C Standard Missile Wpn 1507, BA2	EY 1996 277,565 16,276	EY 1997 59,315 9,151	EY 1998 0 *15,500	EY 1992 0 *44,600	FY 2000 0 *130,000	FY 2001 0 *161,000	FY 2002 0 *236,000	EY 2003 0 *225,000	To Compl TBD *Cont	Total Cost TBD *Cont
D. Schedule Profile										
_	FY 1996	4	, 1 EX	EX 1997 2 3	4	FY 1998 2 3	& £ 4	1 2	FY 1999 2 3	4
Acquisition Milestones: - Acquisition Milestone II	1		×							
Engineering Milestones: - AEGIS Combat System (ACS) Preliminary Design Review (PDR)(UOES) - SM-2 BLK IVA PDR - ACS Systems Design Review (Tactical) - SM-2 BLK IVA Critical Design Review - ACS PDR (Tactical)	*	*	*	×			×			
T & E Milestones: - White Sands Missile Range NM (DT/Operation Assessment) Project 2263			Page 3 of 7 Pages	Pages			Exhib	X Exhibit R-2 (PE 0604867C)	X)604867C)	

RDT&E BUD	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R-2 Exhibit)	DATE February 1997
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	turing Development	PE NUMBER AND TITLE 0604867C Navy Area TMD	PROJECT 2263
- UOES - LRIP - Navy Area TBMD TECHEVAL (DT) - Navy Area TBMD OPEVAL - Acquisition Milestone III - FUE	4thQFY00 2ndQFY01 4thQFY01 2ndQFY02 3rdQFY02		
Project 2263	Pa	Page 4 of 7 Pages	Exhibit R-2 (PE 0604867C)

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RD	RDT&E PROGRAM ELEME	SRAM EL		NT/PROJECT COST BREAKDOWN (R-3)	COST B	REAKDO	WN (R-	3)	DATE Fe	February 1997	76
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	ig and Manı	sfacturing [)evelopme	ınt	PE NUMBEF 060486	PE NUMBER AND TITLE 0604867C Navy Area TMD	Area TMD			PF 22.	PROJECT 2263
A. Project Cost Breakdown (\$ in Thousands)	reakdown (S in	Thousands)									
				FY 1996		FY 1997	FY 1998	EY 1999			
a. Proeram Manag	Program Management/Integration	c		0		2,227	2,225	2,300			
	ring			0		54,481	37,181	34,139			
	ement			0 (5,106	5,800	5,500			
	# CO.					7,206	00¢,8	000,/			
e. Ship System MODS	SUS sis			0		55,182	68,050	58,000			
	& Proc			0		86,229	100,775	75,000			
	tion			0		7,867	4,971	8,809			
				0		4,217	3,500	2,000	_		
	pport			0		7,132	8,500	6,200			
k. Travel	Travel					10.611	24.470	21.600			
i. Development rest & Evaluation	t & Evaluation	_		,		405	1,500	2,000			
n. Other/Miscellaneous	eous			0	_	547	2,400	150			
Total					24	241,330	267,822	226,748			
B. Budget Acquisition History and Planning Information (\$ in Thousands)	ition History an	d Planning Inf	ormation (S i	n Thousands)							
Performing Organizations:	nizations:										
Contractor or Government Performing	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total Program
Product Development Organizations Martin Marietta CPFF	ent Organization CPFF	2 9				00	39,280	43,600	30,000	TBD	112,880
NS W C/Danigren						>	2)	
Project 2263				Pa	Page 5 of 7 Pages	şes		Exh	Exhibit R-3 (PE 0604867C)	0604867C)	
						(

RDT&E PROGRAM ELEME	OGRAM EL		NT/PROJECT	COST B	REAKD(COST BREAKDOWN (R-3)	3)	DATE	February 1997	760
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	ınufacturing	Developme	ınt	PE NUMBER AN 0604867C		DITITE Navy Area TMD				PROJECT 2263
Contractor or Contract										
		Performing	Project	Total						
refroming of Funding	Ubligation Defe	Activity	Office	Prior to	Budget	Budget	Budget	Budget	Budget to	Total
	Laic	EAL	EAC	FX 1996	FY 1996	EY 1997	FY 1998	FY 1999	Complete	Program
Holloman AFB					-	13,913	14,651	8,639	TBD	37,203
SMCo					0 0	960	1,200	1,100	TBD	3,260
Motorola					-	130,102	052,230	143,000	TBD	434,392
RFAS					0	7,040	900,	,050 500	Tan	23,890
Miscellaneous					0	12,220	11,456	7,870	TBD	31,546
Support and Management Organizations	izations									
Raymond	:				0	536	069	750	TBD	1 976
Engineering							,			2/1
NSWC/Port					0	139	192	200	TBD	531
NAWC/Pt Mugu	•				C	130	100	200	TBD	163
Vitro					0	1,120	1.500	1.100	TRD	3 720
Miscellaneous					0	2,920	2,750	2,306	TBD	7,976
Test and Evaluation Organizations	<u>इ</u> प									
NAWC/WPNDIV					0	929	720	550	TBD	1,826
Pt Mugu BMDO					-	2 512	2162	7 7 7	É	
WSMR NM					-	1,200	0,510	3,334	TBD	13,163
NSWC/Port					0	089	850	1,680	TBD	3,150
Hueneme									1	
NAWC/China					0	3,600	4,500	3,600	TBD	11.700
Lake								`		
Miscellaneous					0	8,600	5,125	7,669	TBD	21,394
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)	and Planning In	formation Con	tinued (\$ in Th	(spuesno)						
Government Furnished Property:	ty:									
Project 2263			Pa	Page 6 of 7 Pages	Sa		Exh	Exhibit R-3 (PE 0604867C)	0604867C)	

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RDT&E PROGRAM ELEMEN	PROG	SAM EL	T/PROJECT	COST BREAKDOWN (R-3)	SEAKDC	JWN (R-3		DATE Fe	February 1997	97
BUDGET ACTIVITY 5 - Engineering and Manufacturing Develo	l Manufa	acturing [Development	PE NUMBER AND TITLE 0604867C Navy	AND TITLE C Navy	PE NUMBER AND TITLE 0604867C Navy Area TMD			7 2	РРОЈЕСТ 2263
Contract Method' Item or Fundi	rype ng	Award or Obligation Date	Delivery Date	Total Prior to FY 1996	Budget FY 1996	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget to Complete	Total <u>Program</u>
Product Development Property	erty	-								
Support and Management Property	roperty									
Test and Evaluation Property	ži.									
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation	nent gement in					218,327 4,854 18,149	243,237 5,324 19,261	204,159 4,556 18,033		665,723 14,734 55,443
Total Project						241,330	267,822	226,748		735,900
			,							
Project 2263			Pa	Page, 7 of 7 Pages	53		Exhi	ibit R-3 (PE	Exhibit R-3 (PE 0604867C)	·

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RDT&E BUDGET ITEM		TIFICA.	TION SI	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhil	bit)		DATE Fek	February 1997	97
BUDGET ACTIVITY 6 - Management and Support			PE NE 000	PE NUMBER AND TITLE 0605218C Ballistic Missile Defense	ritle Ballistic N	lissile De	fense		P 4	РКОЈЕСТ 4000
COST (\$ In Thousands)	FY 1996 Actual	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	Cost to Complete	Total Cost
4000 Program Management and Support	158,748	0	0	0	0	0	0	0	ТВО	ТВО

A. Mission Description and Budget Item Justification

This project provides support in three basic areas: personnel and related support costs; funding to meet fluctuation costs and contract terminations; and assistance required to fund support service contracts.

located within the Washington, D.C. area, as well as BMDO's Executing Agents within the US Army Space & Strategic Defense Command, U.S. Army PEO Air and Personnel and related support costs common to all BMDO projects include support of the Office of the Director, Ballistic Missile Defense Organization and his staff and Missile Defense, U.S. Navy PEO for Theater Air Defense, SAFVAQP, and the Joint National Test Facility. This project supports funding for overhead/indirect personnel costs, benefits, and infrastructure costs such as rents, utilities, supplies, etc. The BMDO prioritizes funding within this project to meet operational, contractual, and statutory fiscal requirements. Operational requirements include reimbursable (DFAS). Contractual requirements include reserves for special termination costs on designated contracts and provisions for terminating other programs as required. BMDO has additional requirements to provide for foreign currency fluctuations on its limited number of foreign contracts. Finally, statutory requirements include services acquired through the Defense Business Operating Fund (DBOF), such as accounting services provided by the Defense Finance and Accounting Service funding for charges to cancelled appropriations in accordance with Public Law 101-510.

BMDO projects; and support of design reviews and technology interface meetings. Program control tasks include assessment of schedule, cost, and performance, with personnel. Typical efforts include cost estimating, security management, contracts management, strategic relations management and information management. These Assistance required to support BMDO overhead management functions is contained in this project. This assistance ranges from operational contracts to fully support attendant documentation of the many related programmatic issues. The requirement for this area is based on most economical and efficient utilization of contractors efforts include assessment of technical project design, development and testing, test planning, assessment of technology maturity and technology integration across functions such as ADP operations, Access control offices, and graphics support, to supportive efforts required, as well as to supplement the BMDO government versus government personnel.

The FY 1996 Defense Authorization Act eliminates the management program element effective with the FY 1997 President's Budget submission. This overhead management and indirect program support funding has been realigned in accordance with Public Law 104-106.

This project is assigned to the Budget Activity and Program Element codes as identified in this descriptive summary in accordance with existing Department of Defense policy. It further provides an audit trail for FY 1995 and FY 1996 management account funding.

Project 4000

age I of 3 Pages

Exhibit R-2 (PE 0605218C)

RDT&E BUDGET ITEM JUSTIFICATION	USTIFICATION SHEET (R-2 Exhibit)	xhibit)	DATE February 193.
BUDGET ACTIVITY 6 - Management and Support	PE NUMBER AND TITLE 0605218C Ballis	DITILE Ballistic Missile Defense	PROJECT 4000
 FY 1996 (\$ in Thousands): - \$ Provided management and support for overhead/indirect fixed costs such as civilian payroll, travel, rents & utilities and supplies. - \$ The funding provided by this project has enabled the executing agents to centralize funding and management of these common and recurring operating and infrastructure costs. - \$ Products were generated on a continuing basis. - \$0 	ect fixed costs such as civil executing agents to centrali	ian payroll, travel, rents & ce funding and managemer	utilities and supplies. nt of these common and recurring
FY 1997 (\$ in Thousands): - \$ This project has no funding in FY 1997 under this PE. - \$0 Total	į		
FY 1998 (\$ in Thousands): - \$ This project has no funding in FY 1998 under this PE. - \$0 Total			
FY 1999 (\$ in Thousands): - \$ This project has no funding in FY 1999 under this PE. - \$0 Total			
B. Program Change Summary (\$ in Thousands)			
FY 1996 Previous President's Budget Current Budget Submit/President's Budget	EY 1997 FY 1998 0 0	998 FY 1999 0 0 0 0	Total Cost 146,530 158,748
Change Summary Explanation: Funding: Funding reduced in conjunction with congressional direction to eliminate program growth; management costs realigned to technical program elements effective with FY 1997.	o eliminate program growtl	ı; management costs realig	ned to technical program elements
Schedule: None			
Technical: None			
Project 4000	Page 2 of 3 Pages	Ě	Exhibit R-2 (PE 0605218C)

RDT&E BUDGET ITEM J	EM JUST	TFICAT	HS NOI	USTIFICATION SHEET (R-2		ibit)		DATE Fet	February 1997	71
BUDGET ACTIVITY 6 - Management and Support			PE NU 060	PE NUMBER AND TITLE 0605218C Balli	रागाट Ballistic Missile Defense	issile De	fense		PR(РРОЈЕСТ 4000
C. Other Program Funding Summary (\$ in Thousands)	usands)						:			
	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	To Compl	Total Cost
D. Schedule Profile										
	FY 1996 2 3	4	1 2	EX 1997 2 3	4	FY 1998 2 3	∞l ε. 4		FY 1999 2 3	4
			,							
Project 4000			Page 3 of 3 Pages	3 Pages			Exhibi	Exhibit R-2 (PE 0605218C))605218C)	